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# Electric Railway Journal

## Volume 58

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# Instructions for Use of Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

## CLASSIFIED LIST OF KEYWORDS

### ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accidents (including wrecks)
Safety first

### CARS AND OTHER VEHICLES

Automobiles
Cars (including car design)
Locomotives
Motor buses
Motor cars, Gasoline
Motor trucks
Service and tower wagons
Trackless trolley
Work and wrecking cars

### CAR EQUIPMENT

Bearings
Brakes and compressors
Current collection
Electrical equipment
Fixtures
Gears and pinions
Motors
Trucks
Wheels and axles

### EMPLOYEES

Employees
Labor
Strikes and arbitrations
Wage decreases
Wages and working agreements

### FARES

Fare collection (including apparatus)
Fare decreases
Fare increases
Fare increases sought
Fares
Tickets and tokens
Traffic investigations
Traffic stimulation

### FINANCIAL, LEGAL AND STATISTICS

Abandoning of lines
Accounting
Appraisal of railway property
Financial
Franchises
Insurance
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Service at cost
Statistics
Taxes

### HEAVY ELECTRIC TRACTION

Heavy electric traction (general)
Locomotives

### MAINTENANCE OF EQUIPMENT

Insulating materials
Lubrication
Maintenance practice
Metals
Purchases
Repair shop practice
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

### POWER

Energy checking devices
Energy consumption
Fuel
Overhead contact system
Power distribution
Power generation
Power stations and equipment
Substations and equipment
Switchboards and equipment

### STRUCTURES

Carhouses and storage yards
Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals
Waiting stations

### TRACK

Pavements
Rail joints and bonds
Rails
Special trackwork
Ties
Track construction
Track maintenance

### TRAFFIC AND TRANSPORTATION

Freight and express
Interurban railways
Merchandising transportation
Publicity
Public, Relations with
Schedules and timetables
Signals
Stopping of cars
Traffic investigations
Traffic regulation
Traffic stimulation
Transportation, Metropolitan

### MISCELLANEOUS

Corrosion
Electrolysis
Engineers
Highways
Living costs
Management
Municipal ownership
Railways (general)
Snow removal
Standardization
Subways

# INDEX TO VOLUME 58

PAGES BY WEEKS

| | | | |
|---|---|---|---|
| July 2 | 1 | to | 38 |
| July 9 | 39 | to | 78 |
| July 16 | 79 | to | 118 |
| July 23 | 119 | to | 156 |
| July 30 | 157 | to | 190 |
| August 6 | 191 | to | 228 |
| August 13 | 229 | to | 266 |
| August 20 | 267 | to | 304 |
| August 27 | 305 | to | 344 |
| September 3 | 345 | to | 384 |
| September 10 | 385 | to | 424 |
| September 17 | 425 | to | 462 |
| September 24 | 463 | to | 540 |
| October 1 | 541 | to | 576 |
| October 8 | 577 | to | 670 |
| October 15 | 671 | to | 722 |
| October 22 | 723 | to | 762 |
| October 29 | 763 | to | 806 |
| November 5 | 807 | to | 848 |
| November 12 | 849 | to | 888 |
| November 19 | 889 | to | 930 |
| November 26 | 931 | to | 976 |
| December 3 | 977 | to | 1014 |
| December 10 | 1015 | to | 1056 |
| December 17 | 1057 | to | 1096 |
| December 24 | 1097 | to | 1136 |
| December 31 | 1137 | to | 1166 |

## A

Abandoning of lines:
—Bridgeton & Millville Tr. Co. line, 220
—Causes and bus solution, Comments on, 2
—Dallas, Texas; Short line in, 298
—Des Moines, Iowa; 218, *237
—Indiana, Columbus & Eastern Traction Company proposes, 754, 880, 1127
—Los Angeles, Washington line, 418
—Manistee, Mich., service suspended, 416, 1002
—Municipal consent required, 220
—Niagara Falls, N. Y., 536
—Ocean Shore R.R. branches, 219
—Saginaw-Bay City Railway, 296, *323, 1044
—Wisconsin bill permitting is vetoed, 149
Abilene, Texas:
—Abilene Street Railway:
  Operation to be resumed, 298
Accident claim department:
—Co-operation of other departments needed [Connell], 525
—Employees' claims, Collecting [Bishop], 873
—Exaggerating claimants [Lonergan], 874
—Function of [Reynolds], 735
—Investigations, Conducting of [Green], 737
—Letter investigation advocated [Robinson], 739; Discussion [A. E. R. C. A.], 736
—Middle West claim agents organize, 792
—Psychology in adjusting claims [Butterworth], 740; Discussion [A. E. R. C. A.], 736
—Publicity in litigated cases [Moore], 792
—Statistics important [Handlon], 656
Accident prevention (see Safety first)
Accidents:
—Automobile accidents in Rochester, N. Y. [Quigley], 606
—Cable car runs away, *1157
—Cost of settlements, 1117, 1148.
—Decreasing number of, 823
—Interurban cars crash, *1086
—Mule injured, Fault of owner,, 216
—New York City in 1920, 376
—One-man cars reduce [Ashton], 875
—Perfect score on Pacific Electric, 419
—Public pays for, 333
—Rear-end collision, *919
—Record in Chicago [Kelker], *244; Comments on, 229
—Safety cars decrease [A. E. R. A. Com.], 619
—Subway accident in Paris, *838
—Train jumps track in Springfield, Mass., 414
—Wisconsin cars overturned, *765
Accounting:
—Adapting for particular uses [Hopson], 705; Discussion, 698
—Aid in solution of railways' troubles [Webster], 695
—Calculating machine, 944
—Construction costs [Davis], 703; Discussion [A. E. R. A. A.], 698
—Freight [A. E. R. A. A. Com.], 651; Discussion, 653
—I. C. C. system, Questions and answers, 30, 175; A. E. R. A. A. Report, 696
—Light and power consumers [Eaton], 408
—Motor utilities, System proposed for, 878
—Power costs at delivery point [Hagan], 409
—Perpetual inventory advocated [May], *398
—Railway cost [Bowman], 700; Discussion [A. E. R. A. A.], 697
—Stores [A. E. R. E. A. and A. E. R. A. A. Com.], 631; Discussion, 697
Adrian, Michigan:
—Adrian Street Railway:
  Discontinuance proposed, 295
Advertising (see also Merchandising transportation and Publicity):
—Buses in New York State, 1052
—Interurbans' methods ["Observer"], *505
Akron, Ohio:
—Living costs, 51
—Northern Ohio Traction & Light Co.:
  Car house and storage facilities, *852
  City appraisal, 416
  "Civility" campaign, 755
  Preferred stock offer, 181
  Motor buses ordered, 565; Extension requested, 1092
  Reducing maintenance costs [See], *684
  Trolley bus proposed, 184
  Wage arbitration, 51, 68, 179, 216
Albany, N. Y.:
—Interurbans resume service to, 413
—Jitney situation, 261, 413, 456, 665, 717, 1124
—United Traction Co.:
  Annual report, 29
  Commission approves one-man cars, 845
  Eight-cent fare sought, 1009
  Election significance, 920
  January-June report, 337
  Service resumption, 144, 531
  Strike, Court statement on, 868
  Strike declared off, 961; Cost of, 1005
  Strikers appeal contempt judgment, 563
  Troy fare controversy, 1090, 1132
Alton, Ill.:
—Jitneys restrained, 338
Amalgamated Association of Street & Electric Railway Employees of America:
—Annual convention, 556
Amarillo, Texas:
—City ownership recommended, 878
American Association of Traveling Passenger Agents:
—Annual convention, 791
American Cities Co. (see New York City)
American Engineering Council (see Federated American Engineering Societies)
American Electric Railway Accountants' Assn.:
—Annual convention:
  Papers and proceedings, 608, 695-707
  Program, 330, 410
—Committee activities:
  Economics of schedules, 649
  Executive, 695
  Freight accounting, 651
  Standard classification of accounts, 175, 696
  Stores accounting, 174, 631; Discussion, 697
—Officers elected, 699
American Electric Railway Association:
—"Aera," Advisory committee report on, 612
—"Aera," Status of [Gadsden], 609
—Annual convention:
  Discussion urged, 425, 464
  Entertainment, 449
  Hall, *250
  Papers and proceedings, 580-655; Comments on, 577
  Program, 106, 328; Comments on, 541
  Transportation arrangements, 528
—Bureau of Information and Service:
  Advertising section, 66
  Bulletins available, 66, 834
  Report on, 614
  Traffic ratios, 220
—Bus companies not admitted to membership, 612; Comments on, 577
—Committee activities:
  Company sections, 106, 622
  Co-operation of manufacturers, 1040
  Electrolysis, 175, 616
  Entertainment, 330, 369, 623
  Executive, 143, 249, 611, 657, 836, 1039; Comments on, 231
  Mail pay, 613; Comments on, 763
  Membership, 1040
  Merchandising transportation, 106
  Mid-year dinner, 915, 1152
  National relations, 617
  National Utility Associations, 212, 622
  Nominating, 330, 369, 528, 615
  One hundred, 622
  Publicity, 614, 1039
  Reorganization, 105, 612; Comments on, 81, 230
  Resolutions, 621
  Safety car, 213, 619
  Special dinner, 1040
  Trackless transportation, 24, 174, 616, 1082
  Valuation, 369, 618; Comments on, 672
—Committee personnel, 958
—Company section activities:
  Chicago Elevated R.R., 66, 1082
  Connecticut Company, 1082
  Public Service Railway, 1120
  Rhode Island Co., 24
—Defaulting bookkeeper, 369
—Midyear conference:
  Indianapolis chosen, Comments on, 1015
  Program, 1152
  Transportation committee, 1120
—Officers elected, *613, *615; Comments on, 577
—Reorganization:
  Discussion on [Dana], 362; [Sawyer], 363; [Mortimer], 365; [Cram], 365; [Storrs], 402; [Coates], 444; [Shannahan], 523; [Shoup], 523; Comments on, 579
—Secretary selected, 106; Comments on, 79
—Secretary-Treasurer's report, 610
American Electric Railway Claims Association:
—Annual convention:
  Papers and proceedings, 586, 605, 735
  Program, 329
—Officers elected, 586, 735, 737
American Electric Railway Engineering Assn:
—American Committee on Electrification proposed, Comments on, 578
—Annual convention:
  Papers and proceedings, 594, 624
  Program, 328
—Committee activities:
  Apprentice systems, 625
  Buildings and structures, 66, 637
  Equipment, 640
  Executive, 642, 1120
  Heavy electric traction, 106, 626
  Power distribution, 24, 631, 1082
  Power generation, 628
  Purchases and stores, 631, Discussion, 697
  Standards, 528; Comments on, 541
  Subjects, 369; Comments on, 672
  Unification of car design, 639
  Way, *634
—Committee personnel, 960; Comments on, 978
—Officers, Nominated, 213; Elected, 642
—Reorganization proposed [Gove], 624; Comments on, 671
American Electric Railway Transportation and Traffic Association:
—Annual convention:
  Papers and proceedings, 587, 589, 603, 605, 606, 607, 643
  Program, 329
—Christmas cards to committee members, 1152
—Committee activities:
  Executive, 143, 643, 792
  Merchandising transportation, 644
  Personnel and training of transportation employees 653.
  Safety work, 648
  Subjects, 369
  Traffic regulations, 647
—Committee personnel, 1040
—Officers elected, *643, 655
—Reorganization proposed [Stevens], 643; Comments on, 671
Americanization:
—Chicago, North Shore & Milwaukee R.R. work, *332.
American Railway Association:
—Mechanical Division meeting postponed indefinitely, 368
—Scrap classification, 383
American Railways Company (see Philadelphia, Pa.)
American Society for Municipal Improvements:
—Annual meeting, 830
American Society for Testing Materials:
—Annual meeting, 103, 175; Comments on, 80
Anderson, Indiana:
—Union Traction Company of Indiana:
  Armature repair records, *783
  Field coils, Repairing [Hester], *14
  Wages decreased, 215
  Watt-hour meters on cars [Luellen], *728
Appleton, Wisconsin:
—Wisconsin Traction, Light, Heat & Power Co.:
  Fare increase, 115
Appraisal of railway property:
—Basis and return on [King], 104
—Capitalization versus amortization, 95; Comments on, 80
—Grand Rapids, Mich., 1083
—Method attacked, Indianapolis, Ind., 377
—Kokomo, Indiana values, 881
—New Orleans situation, 152
—Ohio valuations increased, 415
—Oklahoma properties, 664
—Ottawa, Ontario, 1006
—Pacific Electric Railway, 568
—Public Service Ry., 73, 95, 109, 113; Comments, 80
—Renewal and depreciation allowed, 989
—Reproduction value increased by War, 995
—St. Louis, Missouri, 797, 966
—Special circumstances in Connecticut [Hopson], c443
—Toronto arbitration, 532, 567, 713, 1006, 1045
—"Yardstick" method [A. E. R. A. Com.], 618; Comments on, 672
Arbitration (see Strikes and arbitration)
Arkansas Light & Power Co. (see Pine Bluff, Arkansas)
Association of Electric Railway Men:
—Akron, Ohio meeting, 23; Comments on, 2
Athol, Massachusetts:
—Northern Massachusetts Street Railway:
  Freight operation, *41
  Receiver sought, 1129
Atlanta, Georgia:
—Georgia Railway & Power Co.:
  Discontinue service to Camp Gordon, 715; Government denies claim, 880
  Emergency truck, *734
  Frog repairs, *15
  Interurban fare increase sought, 420; Denied, 716
  Miniature distribution system, *435
  Rebate on College Park fares, 1130
  Remodeling cars for P. A. Y. E., *101
  Universal tie plate, *98
Atlantic City, New Jersey:
—Atlantic City & Shore Railroad:
  Receiver discharged, 70
Attleboro, Massachusetts:
—Attleboro Branch Railroad:
  Freight operation, *41
—Interstate Consolidated Street Railway:
  Freight operation, *41

Abbreviations: *Illustrated. c Communications.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Auburn, New York:
—Auburn & Syracuse Electric Railroad:
Fare schedule reduced, 1051
Wage decrease, 531
Augusta, Georgia:
—Augusta-Aiken Railway & Electric Corp.:
Fare increase sanctioned, 34; Refused, 421
Aurora, Illinois:
—Aurora, Elgin & Chicago R.R.:
Foreclosure sale planned, 1087
Fox River line, Discontinuance proposed, 964, 1044
Future in Elgin, 964, 1044
Interurban service declared inadequate, 716, 844
Loading platform for refuse, *5
Newspaper coupons attract traffic ["Observer"], *505
Wage contract, 145
—Bus petition allowed, 716
Australia:
—Rail standard, *825
—Railway progress, 155, 462
Austria:
—Vienna, Curves of tramway development [Ertel], *199
—Vienna's trackless trolley [Jackson], 1027
Automobiles (see also Motor buses)
—Accidents in Rochester N. Y. [Quigley], 606
—Automobile, Use for on railway property [Dana], c52; [Whitney], 1038; Comments on, 39
—Vehicles in New York, 971
Axles (see Wheels and Axles)

## B

Baltimore, Maryland:
—Baltimore Transit Company:
Bus, New Type installed, *778
—United Railways & Electric Co.:
Fare extension sought, 1049
Hose bridges carried in trailer [Hughes], *241
Loops necessary for trail cars [Palmer], 891
New type safety cars [Palmer], *400
Safety car changes [Palmer], c96
September report, 844
Trail cars [Palmer], *891
Wage decrease proposed, 1005; Agreement, 1083
Welded joints [Wysor], *170
Bamberger Electric Railroad (see Salt Lake City, Utah)
Battle Creek, Michigan:
—Railway favored, 1130; Comments on, 1098
Bearings (see also Lubrication):
—Babbitted:
Tests on [Perry], *905
—Ball and roller bearings:
Carrying capacity of, 1078
Economies from [Porter], 288
Service results of [Perry], *905
Tests on [Perry], *905
—Bronze, Repairing in Montreal, *193
—End play in armature, taking up, 692
—Lubrication of [Morrow], *674; [Treat], 914
—Vacuum oiler, *781
Beaver Valley Traction Co. (see New Brighton, Pa.)
Berlin (see Germany)
Berkshire Street Railway (see Pittsfield, Mass.)
Binghamton, New York:
—Binghamton Railway:
Automobile safety hints, *987
Bond agreement changed, 454
Birmingham, Alabama:
—Birmingham Railway, Light & Power Co.:
Fare increase sought, 114; In effect, 259; Appealed, 339, 413
Semi-Centenary week, 971
—City-railway controversy, 339,413
—Norwood Street Ry.:
Franchise sought, 27
Bloomington, Illinois:
—Interurban bus service, 801
Bonds (see Financial)
Boston Massachusetts:
—Boston Elevated Railway:
Annual report, 533 Comments on, 268
Deficit eliminated, 1127
Expenses, Division of, 533
Fare decrease in Everett & Malden [Dana], *47
Five cent fares extended, 259, 419, 666, 800; 925
Freight operation, *41
Interlocking installation, 48
July report, 533
Malden cars withdrawn, 844
Mutual insurance formed by officials, 254
Telephone announcing, 27
Three year report, 148
—Boston & Worcester Street Railway:
Freight operation, *41
Motor shaft welded, *1073
Wages decreased, 1155
—Eastern Massachusetts Street Railway:
"Boycott" in Hyde Park, 750, 925
Jan.-June report, 181
Jitneys withdrawn in several districts, 969
July-Sept. report, 841
Lowell, Mass., No fare decrease, 1053
Pension system 1155
Readjustment planned 880
Rotary snow and ice digger, *1077
—Election results 1126
—Jitney permit, Temporary, 843, 925
—"No accident" week, 420
Brakes and compressors:
—Brake shoes, etc. [A.E.R.E.A. Com.], 640; Discussion, 641
—Brake slack adjuster, *289
—Compressor, Belt driven, *694
Brakes and compressors (Continued):
—Compressor piston clearances, [Foote], 445
—Double capacity for grades, 782
—Freezing of air systems, 23
—Heat due to brakes, effect of, 362
—High power staff brake, *555
—Jig for rebabbitting connecting rods, *274
—Locomotive brakes for Paulista Railway, 823
—Lubrication of [Morrow], *674
—Reclaiming air compressors, 23
—Slack adjuster construction, *447
Brazil:
—Paulista Railway:
Brake equipment for, 828
Bridgeport, Connecticut (see also New Haven, Conn., Connecticut Company):
—Election as indicative of traction situation 877, Comments on 849
—Jitney situation, 419, 456
Bridgeton, New Jersey:
—Bridgeton & Millville Traction Co.:
Abandonment of some lines, 220
Fare increases, 34
Brill J. G. Company:
—Canadian company formed, 462
British Columbia Electric Railway (see Vancouver, B. C., Can.)
Brooklyn, New York:
—Brooklyn City Railroad:
Annual report, 297
Courtesy of employees required [Morgan], *499
Schedule and traffic records [Morgan], *499
—Brooklyn Rapid Transit Co.:
Employees thrift accounts assured, 416
Financial acts of, Hearing of N. Y. T. Com., 1043
Headwaygraph principles [Roberts], 440
Hose assembling apparatus, *367
Raising track, Unusual method [Cram], *895
Security holders status, 798
Wage decrease, 177 Comments on, 157
Brunswick, Georgia:
—Brunswick & Interurban Railway:
Organizing to succeed City & Suburban Ry., 455, 710
Buffalo & Lake Erie Traction Company (see Erie, Pa.)
Buffalo, New York:
—Buffalo-Lackawanna Traction Co.:
Fare increase, 150
—Electrification plans requested, 796,918
—Erie County Traction Company:
Seven-cent zones authorized, 882
—International Railway:
City-railway controversy, 534, 711, 802, 837, 919, 1132, 1133
Fare inquiry, 534, 1132
Impregnating field coils, *1078
Jan.-Sept. report, 841
Program for 1921, 71
Safety-first campaign, 755
Trackless trolley proposed, 257, 719
Wages decreased, 218
Buses (see Motor buses or Trackless trolleys)
Business revival, Business press can aid [McGraw], 835; 988
"Bus Transportation," Comments on, 764; Communications on, 1036, 1149

## C

California, State of:
—Bus regulation limitations, 1090
—Bus operation, *319, 883
—Commission's Annual report, 1153
—Freight-carrying trucks, Regulation, 969
—Motor utility accounting proposed, 878
—Railroads challenge King tax bill, 70, 180
Camden, New Jersey:
—Jitney regulation, 1132
—Public Service Railway:
Freight service, 340
"Pull together" campaign, 260
—West Jersey & Seashore Railroad:
Annual report, 257
Canada, Dominion of:
—Hydro-radial hearings concluded, 178; Report against, 292
—Report of railways, 418
Cape Girardeau, Missouri:
—Cape Girardeau-Jackson Interurban Railway:
Paving fund proposal, 218
Car cards (see Publicity and Advertising)
Car design (see Cars)
Carhouses and storage yards:
—Akron, Ohio, improves, *852
—Features in Salt Lake City, *347
—Tipple track in Akron, Ohio, *852
Carolina Power & Light Co. (see Raleigh, North Carolina)
Cars (including Car design):
—Bond testing [McKelway], *82
—Center entrance, interurban, *6
—Changes for right hand operation [Murrin], *894
—Compartments for second and third class, *6
—Cushions to absorb jar, Comments on, 305
—Design features affect transportation sale [Litchfield], *491
—Double-deck in Edinburgh, *12
—Double-truck, double-end motor, Design data [A. E. R. E. A. Com], 639
—Elevated in Hamburg [Mattersdorff], *929
—Elevated in Philadelphia Pa., *1063
—Freight and express in Mass., *41
—Freight Interurban, *3
—Interurban:
Designs, *6
Direct current replaces single phase, *543
Steel construction in Germany, 169
Texas Elec. Ry., 247
—Metal ceiling for head lining, 96
—Multiple-unit versus trailers, *395
Cars (including Car design) Continued):
—One-man (see also Cars, Safety):
Accidents decreased by [Ashton], 875
Cedar Rapids, 100 per cent, 864
Double truck, one or two-man operation, 299; [Mullett], 620, *933
Five-cent fare maintained in Tampa, 338
Massachusetts Commission approves, 845
New Hampshire Commission approves, 1092
New York Commission approves, 845
Operation of justified, Comments on, 723
Opposed in Illinois, 537
Proposed for Vancouver, B. C., 536
Saving by in Iowa, *727
Springs for light loads, *97
Strike against, F. J. & G. R. R., 145
Wages increased by, Comments on, 1138
Zone checks by machine, *953
—Purchase of, through car trusts [Curwen], 590
—Remodeling for P. A. Y. E. features, *101
—Safety (see also Cars, One-man):
Approved by Milwaukee Safety Com., 570
Comparative cost with motor bus and trolley bus [Simmon], *394; [Stocks], *514; [Thirlwall], *546; [Andrews], 769; [Stocks], 771
Detroit Municipal Ry., *160
Double entrance in Baltimore [Palmer], *400; [Eddy], c732
Experience with in Pennsylvania [Smith], *20
Extensive use of, 117; [A. E. R. A. Com.], 619
Objected to in Milwaukee, 299, 570
Operating results in Oakland, 314
Publicity before using, *955
Savings by [Thirlwall], 784
Special features of Milwaukee, Wis., 299; [Mullett], 620 *933
Standard versus variations [Palmer], c96
Texas Electric Railway builds, *693
Trailers not competing, Comments on, 932
Win approval in Waterloo, Iowa [Welsh], 524
—Single-truck cars for Finland, *1074
—Smoking and passenger car, *6
—Trackless type:
Brill make, *550
Packard car tried in Detroit, *359
"Trollicar," St. Louis Car Co., *1025
—Trailers in Baltimore [Palmer], *891
—Trailers not competitive with safety cars, Comments on, 932
—Trailers with control in Washington, *43
—Weights, Effect on springs [Seeler], 275
—Weight of one man, double truck car parts, 936
Cartoons (see Publicity, Car cards and posters).
Cedar Rapids, Iowa:
—Bus Petition rejected, 381
—Cedar Rapids & Marion City Ry.:
One-man operation, 864
Central Electric Railway Accountants' Assn.:
—Forty-first meeting, 408
Central Electric Railway Association:
—Committee activities:
Freight claim prevention, Report, 54
Standards, Report, 53
—Engineering Council:
Meetings, 699, 957
Personnel, 915
Plans for, 54; Comments on, 40
Youngstown meeting, 957; Comments on, 932
—Resolutions on death of Wm. Bloss, 143
—Summer meeting, *53
Charleston, W. Va.:
—Charleston-Dunbar Traction Co.:
Officers elected, 180
Road sold, 31
—Charleston Interurban Railway:
Consolidation with C.-D. Tr. Co. planned, 1046
Charlotte, North Carolina:
—Southern Public Utilities Co.:
Coiled springs added on one-man cars, *97
Safety contests success, 1161
Charlottesville, Va.:
—Charlottesville & Albemarle Ry.:
Good will, Increasing, 802
Selling transportation, 718
Chattanooga, Tenn.:
—Chattanooga Railway & Light Co.:
Air sander, *16
Creosote plant successful, *101
Chicago, Illinois:
—Accident record [Kelker], *244
—Aldermen's report on traction, 67
—Bridge construction interrupts service, 1001, *1113
—Chicago Elevated Railway:
Fare decrease sought, 572, 1002
Gates, Positive stop, *1145
January-August report, 1006
January-September report, 1002
New station required raising tracks, 902
Station agents decreased, *772
Traffic during bridge displacement, *1113
—Chicago & Interurban Traction Co.:
Substation destroyed by lightning, *450
—Chicago & Northwestern Elevated Railroad:
Stations attractive, *1146
—Chicago Surface Lines:
Alterations for pageant, *89
Car and bus speeds, 1035
Fare decrease sought, 459, 573, 717, 755, 882, 925, 970, 989, 1035, 1050; Comments on, 977
Fare, Disposition of, 1005
Fare jurisdiction by state, 970
Five-cent fare ordered, 970; Restrained, 1009, 1050, 1083; Comments on, 977
Pageant exhibits, *360
Posters, Colored, *62, *553
Loop rerouting proposed, *938
Skip-stop signs on poles, 683
"Traction Topics," 1117

Abbreviations: *Illustrated. c Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Chicago, Ill. (Continued):
—City-railway controversy, 28, 67, 107, 176, 572, 843, 989, 1009, 1035, 1050, 1083, 1126
—Safety Council work, 331; [Budd], 605
—Subways and transportation, Comments on, 850
—Utilities, Progress by, 293
Chicago & Joliet Electric Railway (see Joliet, Ill.)
Chicago, Lake Shore & South Bend Railway (see Michigan City, Ind.)
Chicago, North Shore & Milwaukee Railroad (see Highwood, Ill.)
Chicago, Ottawa & Peoria Railway (see Ottawa, Ill.)
Chile:
—Electrification, Contract awarded, 576, 670
—Electrification program, *991
China:
—Railway materials, Purchase rules, 1135
Cincinnati & Dayton Traction Co. (see Hamilton, Ohio)
Cincinnati, Ohio:
—Cincinnati & Hamilton Electric Street Ry.:
  Foreclosure decree, 968
—Cincinnati, Lawrenceburg & Aurora Electric Street Railroad:
  Containers for freight, *949
—Cincinnati, Milford & Blanchester Traction Co.:
  Sale negotiations to Ford, 753
—Cincinnati Traction Co.:
  August-September report, 754
  Fare situations, 33, 109, 152, 183, 223, 420, 665, 754
  Franchise tax, Elimination sought, 969; Exemption for 1922, 1156
  Incline reported safe, 69
  Loan by Cincinnati Street Ry., 181
  Ordinance opposed, 33
  Power house men wages fixed, 145
  Power system modernized, *1099
  School tickets, 718
  Ticket plan changed, 882
  Traffic decreases
—Indiana, Columbus & Eastern Traction Co:
  Abandonment of certain interurban lines sought, 754; Opposition, 880, 1127
—Interurban Railway & Terminal Company:
  Abandonment of two lines sought, 1089
—Jitney situation, 537
—Report of Director of Street Railways, 67
—Subway project, Abandonment proposed, 794
—Taxicabs soliciting forbidden, 381
—West End Terminal Railway:
  Plans for, 1002
Circuit breakers (see Electrical equipment)
Citizens Traction Company (see Oil City, Pa.)
Claim department (see Accident claim department)
Cleveland, Ohio:
—Cleveland Railway:
  Accident cost, 1117
  Automatic substations [Bale], 58
  Concrete breaker, *327
  Extension financed by owners effected, 537
  Fare experiment, Low rate 32, *130, 222; Failure, 261; Comments on, 119
  Financial difficulties, 453, 537, 1159
  June report, 220
  November report, 1160
  October report, 1046
  Overhead construction kinks, *687
—Lake Shore Electric Ry:
  Newspaper advertising ["Observer"], *505
—Railroad terminal disapproved, 377
—Street Railway Commissioner's report, 1154
Cleveland, Painesville & Eastern R.R. Co. (see Willoughby, Ohio)
Clinton, Davenport & Muscatine Railway (see Davenport, Iowa)
Coal (see Fuels)
Coin counter, Simple, *209
Columbia, South Carolina:
—Columbia Railway, Gas & Electric Company:
  Discontinuance of certain lines sought, 1050
Columbus, Ohio:
—Columbus, Delaware & Marion Electric Co.:
  Bond issue, 70
  Defrauders discovered, 840
  Track relocation opposed, 293
—Columbus Railway, Power & Light Co.:
  Extension, Difficulties over, 293
  Improvement work of, 750
  Management suit, 714, 963
  Unemployment discussed, 795
—Jitney regulation, 801
—Motor bus service, 1052
Common carrier, Comments on, duties of, 158
Commonwealth Power, Railway & Light Co. (see Grand Rapids, Mich.):
Community Traction Co. (see Toledo, Ohio)
Connecticut Co. (see New Haven, Conn.)
Connecticut, State of:
—Regulations for jitneys, 50, 74, 75, 113, *151, 184, 223, 262, 301, 380, 419, 757; Comments on, 40, 158
Connecticut Valley Street Railway (see Greenfield, Mass.)
Controllers (see Electrical equipment for cars)
Convention papers, Comments on types, 1
Corpus Christi, Texas:
—Corpus Christi Railway & Light Company:
  Five cent ticket fare, 970
Corrosion (see also Electrolysis):
—Gases from locomotives cause [Scott], *1079
—Soil corrosion:
  Cast iron and other metals in alkaline soils [Smith and Shipley], 911
  Example of [Smith], c52
  Tests on, 909
Covington, Kentucky:
—South Covington & Cincinnati Street Railway:
  Dixie terminal opened, *865
  Wage decrease proposed, 178; Accepted, 216
Crane, Crawling tractor type, 446
Creosote (see Ties)
Crocker-Wheeler Co. sells Canadian plant, 423
Crossings, Grade (see Safety first)
Crowded cars in Italy, *90
Cuba:
—Cienfuegos, Palmira & Cruces Electric Railway & Power Co.:
  Suit for breach of contract, 298
—Havana Electric Railway, Light & Power Co.:
  Annual report, 336
  Maintenance difficulties, 171
—Havana, Subway proposed
—Hershey Cuban Railway Cars, *6
Cumberland County Power & Light Co. (see Portland, Maine)
Cumberland, Maryland:
—Cumberland Electric Railway:
  Merger with power company proposed, 922
Cumberland Railway & Power Co. (see Raleigh, North Carolina)
Current collection:
—Plow testing, *139
—Third rail system on N. P. R.R., 743
—Trackless trolley shoe, *550; [Jackson], *859
—Trackless trolley wheels, *1025
—Trolley stand, Roller bearing, 733
—Trolley wheels versus shoes, Discussion [C. E. R. A.], 957

D

Dallas, Texas:
—Dallas Railway:
  Abandons short line, 298
  Co-operative discussion, 757
  Fare rate continued, 73
  Improvement program, 1158
  Hints to trainmen, 711
  July report, 663
  October report, 1008
  Publicity campaign through employees, 957
  Traffic regulation, 259
  Wages decreased, 293
—Texas Electric Railway:
  Interurban cars for, *247
  Safety cars built by, *693
  Stock increase, 337
  Wages decreased, 961
  Weed cutter, *448
Danbury, Connecticut:
—Danbury & Bethel Street Railway:
  Buses to West Danbury, 381, *516, 556, 1121
Davenport, Iowa:
—Clinton, Davenport & Muscatine Railway:
  Monthly commutation scheme in Muscatine 758, 883
—Tri City Railway:
  Fare decrease sought, 883
  Maintenance practice, 527
  One-man car controversy, 537
  One-man car operation, *727
  Power plant accidents, 752
  September report, 876
  Transfer, Punching eliminated, *1147; Comments on, 1137
Dayton, Ohio:
—Dayton Street Railway:
  Strike settled, 178
—Jitney situation, 450, 1091
—Peoples Street Railway:
  Strike settled, 178
—Railway difficulties, 450
Decatur, Illinois:
—Jitney situation, 927
Delaware & Hudson R.R.:
—Trolley lines report, 29
Delaware Lackawanna & Western Railroad:
—Electrification postponed, 424, 1135
Denver, Colorado:
—Denver & Interurban Railroad:
  Electrifying to Union Station, 109
  Receiver discharged, 149
—Denver Tramways:
  Fare controversy, 570
  Strike, Report on, 793
  Wages decreased, 293
Depreciation (see Appraisal of railway property or Financial)
Des Moines, Iowa:
—Bus Association offers service, 150, 372, 530; Comments on, 1017
—Bus regulatory ordinance, 1153
—City-railway controversy, 107, 144, *237, *283, 372, 411, 530, 658, 709, 748, 961, 1001, 1033, Comments on, 267, 931, 978, 1017
—Des Moines City Railway:
  Franchise, Features, 749, 1033; Approved, 1001
  Service resumed, Temporary, 372, 311; Permanent, 793, 1033, Comments on, 1017
  Suspension proposed, 107, 144; In effect, 218, *237, *283, 325, 311, 372, 411, 530, 563, 657, 658; [Lewis], 791
  Wage decrease, 108
Detroit, Michigan:
—Detroit Bus Co.:
  Annual report, 418
  Operation of, 341
—Detroit Municipal Railway:
  Bus operation contemplated, 1161
  Cars of, *159
  Construction work praised, 838
  Extensions opened, 371, 795
  Operating arrangements with D. U. R., 1041, 1086, 1125
  Overhead construction features, *159
  Policies indorsed, 876
  Power from Canada proposed, 450
  Salesmanship talks to employees [Bigelow], *1111, 1143
  September report, 798
  Stops, Warning signs for, *693
  System layout, *123
  Tower truck, *680
  Track construction, *121; Comments on, 120
Detroit, Michigan:
—Detroit Municipal Ry. (Continued):
  Trolley buses proposed, 37; Specifications, 320; Bids, 334; Trial, *359, *522, *1025
  Wages not to be discussed, 450
  Winch truck, *910
—Detroit United Railway:
  City purchase of lines controversy, 69, 109, 146, 176, 251, 294, 452, 529, 662, 712, 751, 876, 918, 964, 1001, 1041
  Fare decrease, 32
  Financial situation, 295, 713
  Ford village controversy, 562
  Interurban fare controversy, 536
  Operating arrangements with city, 1041, 1086, 1125
  Publicity department unchanged, 67
  Schedule changes, 338
  Stock dividend refused, 1045
  Stock issue denied, 418
  Valuation question, 1045
—Elevated railway proposed, 562
—Transportation of future, 331
Door mechanisms (see Fixtures)
Dubuque, Iowa:
—Dubuque Electric Company:
  New franchise, proposed, 661
Duluth, Minnesota:
—Duluth Street Railway:
  Fare controversy, 381, 456, 1050
Dynamite, Non-freezing type, 1076

E

Eastern Massachusetts Street Ry. (see Boston, Mass.)
Eastern Pennsylvania Railways (see Pottsville, Pennsylvania)
East Liverpool, Ohio:
—State and interstate fares must be equal, 1092
East St. Louis, Illinois:
—East St. Louis & Suburban Railway:
  Deficit advertised, 664
  Wage reduction proposed, 28, 179, 964; Award, 1042.
Eighth Avenue Railroad (see New York City.)
Electrical equipment for cars (except Motors):
—Arrangement to reduce maintenance, 348
—Circuit breaker, Hinged handle, *734
—Circuit breaker testing, *139
"Electrical Review" purchased by McGraw-Hill, 1084
Electric Short Line Ry. (see Minneapolis, Minn.)
Electrification (see Heavy electric traction)
Electrolysis:
—American Committee on:
  Report, 175, 726, 913; [A. E. R. A. Com.], 616
—Corrosion of cables, 442
—Interconnection of track crossing, Detroit, 391
—Measurement of earth currents, [McCollum], *809; Comments on, 807
—Three wire distribution in Wilmington, Del. [Way], *307; Comments on, 306
—Three-wire system in Winnipeg, 839
—Three-wire system, Track voltage of [Smith], c555
El Paso, Texas:
—El Paso Electric Railway:
  Service, An example of [Lemmon], 442; Comments on, 425
Emergency bus system (see New York City)
Employees (see also Labor, Strikes and Arbitrations, Wages):
—Activities in Kansas City, 254
—Apprentice systems [A. E. R. E. A. Com.], 625
—Bonus awarded in Los Angeles, 917, 1155
—"Business as Conductor," Comments on, 120
—Bus operators admitted to Amalgamated, 556; Comments on, 673
—Car cards to be submitted by, 957
—Claims of, Handling [Bishop], 873
—Company publications:
  Kansas City, Mo., 796, *879
  Philadelphia, Pa., *955
—Compensation in Utah, 839
—Confidence will aid transportation [Kelsay], 64
—Courtesy requisite to transportation sales [Morgan], *499
—Direct salesmen of transportation [Barnes], 480
—Director from, Louisville, Ky., 1158
—Dispatching principles for the individual, Comments on, 889
—Educate to teach public [Wickwire], 599
—Employment status, June, 132
—Housing plans of I. R. T., 375
—Instruction Claim department co-operation [Connell], 525; [Thomas], 524
—Mutual benefit association [Anderson], 1118
—Pension system on E. M. S. R., 1155
—Personnel work [Boyce], 19, [A. E. R. T. & T. A. Com.], 653; Discussion, 654
—Picnic of P. R. T., *955
—Profit sharing plan [McCahill], 18
—Rules, Dialogue on observance of, 878
—Salesmanship, Talks on [Bigelow], 1111, 1143
—Selection of [Norris], 607
—Seniority for safety car operators, 1162
—Service hints, 711
—Street calling required in Minneapolis, 919
—Strikers status, 868
—Thrift accounts assured by B. R. T., 416
—Trainmen's bonus in Los Angeles, Cal., 917
—Turnover statistics, *731, *993
—Unemployment conference, Comments on, 541; Recommendations, 660, 686
—Wage possibilities [Todd, by Bozell], 1018
—Workmen's compensation in New York [Otis], 912
Energy checking devices:
—Installation of and saving by [Luellen], *728
—Records and savings by [Wood], *681

Abbreviations: *Illustrated. c Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Energy consumption:
—Hamburg Elevated Railway [Mattersdorf], *979
—Reducing by checking [Wood], *681; [Luellen], *728
—Saving by proposed Superpower System, 819
Engineers:
—Executive leadership by, Comments on, 763
—Field of, 381
—Marshal Foch honored as, 1081
England (see Great Britain)
Erie County Traction Company (see Buffalo, N. Y.)
Erie, Pennsylvania:
—Buffalo & Lake Erie Traction Company:
  Fare controversy, 802
Express (see Freight and express)
Eureka, California:
—Humboldt Transit Co.:
  City votes to purchase, 149; Taken over, 749
Europe:
—Electrification plans, 352

## F

Fairmount, West Virginia:
—Monongahela Power & Railway Co.:
  Coal properties sold, 966
  Stock sales, 295
  Switching locomotive built, *246
  Wages decreased, 68
Fare collection (see also Tickets and tokens)
—Adjustable change carrier, *448
—Bus system in Gloucester, Mass., *773
—Change making fare box, *401
—Coin and ticket sorter, *1073
—Featherweight gates in New York, *940
—Gate collection in Everett, Mass. [Dana], *47
—Prepayment and postpayment [A. E. R. E. A. Com.], 637
—Transfers, Punching eliminated, *1147; Comments on, 1137
—Weekly passes (see Fares)
—Zone checks by machine, *953
Fare decreases:
—Boston Elevated extends five-cent lines, 259, 419, 666, 800
—Cincinnati, Ohio, 183, 223, 754
—Cleveland, Short haul, *130
—Detroit, Mich., 32
—Everett & Malden [Dana], *47
—Five cent experiment in Connecticut, 844, 883, 885, 924, 970, 1011, 1051, 1133
—Five-cent fare trial in Houston, Texas, 1010
—Methods of, Comments on, 119
—Monthly pass in Joliet, Ill., 1051
—Proposed for:
  Chicago, Illinois, 459, 572, 717, 843, 925, 970, 989, 1002, 1009; Comments on, 977
  Connecticut Co. 665, 759, 837, 883
  Davenport, Iowa, 883
  San Antonio, Texas, 1011, 1054
  Seattle, Washington, 750, 758, 881
  Syracuse, N. Y., 666
—Round trip on Oregon Elec. Ry., 260
—Tickets in Corpus Christi, Texas, 970
—Transfer elimination, Comments on, 1137
—Washington, D. C., 223, 456
Fare increases:
—Augusta, Georgia, 34
—Birmingham, Alabama, 259, 339
—Buffalo interurbans, 150, 882
—Denied:
  Augusta-Aiken Ry., 421
  Lynchburg, Virginia, 299
  Minneapolis, Minn., 457
  Omaha, Nebraska, 452
  San Jose, California, 1049
  Utica, N. Y., 535
—Duluth, Minn., 381
—Helena, Montana, 925
—Jackson, Mich., 459
—Knoxville, Tenn., 33, 73, 152
—Memphis, Tenn., 339
—Minneapolis, Minnesota, 341, 380
—Nashville Tenn. 153
—Newark N. J., Transfers, 223, 755
—Revenue from [Kappeyne], *954
—Salt Lake & Utah R.R., 185
—Spokane, Wash., 32
—Toledo, Ohio, 301, 536
—Toronto, Ontario, Can., 666
—Winnipeg, Man., Can., 222
—Wisconsin Tr., Lt., Ht. & Pr. Co, 115
Fare increases sought:
—Albany, N Y., 1009
—Birmingham, Alabama, 114
—Georgia interurban, 420
—Helena, Mont., 537
—Indianapolis, Ind., 224, 1117
—Los Angeles, Cal., 184, 380, 1010
—Minneapolis, Minn., 33, 223
—Mobile, Alabama, 565
—Newark, N. J., 73, 95, 109, 113, 260, 339, 458, 534, 573, 717, 793, 843, 1091, 1131
—Raleigh, N. C., 34, 802, 1010
—St. Paul, Minn., 29, 33, 259, 457, 802, 882, 926
—Southern Pacific Co., 73
—Troy New York, 1090, 1132
—Trenton, N. J., 667; Denied, 718
Fares:
—Bargain sale of [Boyce], *353
—"Boycott" started against, 750, 925
—Canadian city rates, 927
—Disposition of, on Chicago Surface Lines, 1005
—Distance variation desired [Todd, by Bozell], 1018
—Effect of changes:
  Everett & Malden [Dana], *47
  Louisville, Ky., 455
  Michigan United Rys., 224
  Portland, Oregon, 185
  Youngstown, Ohio, *1104
—Effect on wages [Green], 732
—Element affecting rider [Dahl], 239
Fares (Continued):
—Emergency proved in N. J., 73
—Factors analyzed [Ashfield], 312
—Franchise not binding, *1091
—Hamburg practice [Mattersdorf], 979
—Increases and changes [Gruhl], 595
—Indiana policy, 1092
—Interstate, Increased by I. C. C., *1091
—Low fares not incentive to riding, 844
—Low rate for short haul, 32, *130, 222; Failure, 261
—Monthly commutation tickets, 758, 883
—Rates based on value of service [Tingley], 998
—Rates not fixed by vote, Comments on, 158
—Relative increases [Burke], *94
—Revenue increase from increased rates [Kappeyne], *954
—Review ordered in Wisconsin, 885
—School tickets in Cincinnati, 718
—Six cents predominates in Ohio, 261
—State, Must equal interstate, 1092
—Study of just fare, Comments on, 119
—Three cent advocated in Seattle, 114, 457; Comments on, 81; Opposed, 716
—Weekly pass:
  Wisconsin results [Jackson], *203, Comments on, 191, 1015
  Youngstown adopts, 534, *899; Comments on, 890, 1015
  Youngstown results, *1104; Comments on, 1098
—Wholesale prices, *1104; Comments on, 1098
—Wisconsin cities, 767
—Zone system:
  Popular in San Diego, Cal., 921
  Proposed for Los Angeles, Cal., 756
  Zurich abandons, *416
Federal Electric Railways, Commission Report:
—Analysis by D. F. Wilcox, 341
Federal Light & Traction Company (see New York City)
Federated American Engineering Societies:
—American Engineering Council:
  Waste elimination report, 173; Comments on, 157
Feeders (see Cables and Power distribution)
Fiber, Strength of, 135
Financial:
—Analysis of railways' difficulties [Gadsden], 581; [Frothingham], 584; Comments on, 577
—Assessment of landowners for construction [Wehle], 552
—Blue-sky bills opposed, 256
—Bond issue, Service at cost aids, 1046
—Bonds maturing in January, 1159
—Bonds versus stocks, 29
—Car purchases through car trusts [Curwen], 590
—Contract for engineering advice abrogated by commission, 73
—Customer ownership securities:
  Advantages [Addinsell], 593
  Aid in moulding public opinion [Grimsby], 787
  Employee purchasers and agents, 321; Comments on, 306
  Partial payment plan in New Jersey, 921
  Plan used in Norfolk, Va., *198
  Preferred stock in Akron, O., 181
  Preferred stock sale in Milwaukee, *110; Comments on, 191
  Public-ownership advantageous [Aylesworth], 791
  Sale and value of [Weeks], 65
—Cycle for railways improving [Todd, by Bozell], 1018
—Default of traction bonds, 922
—Depreciation reserve fund opposed, 31
—Discount, Amortization of [Peirce], 872; Comments on, 931
—Dividends, Comments on psychology due to, 807
—Dividends paid in stock, *663
—Earnings of railways [C. & F. Chron.], 70, 147; Comments on, 39
—Extension aided by owners benefited, 537
—Foreclosures:
  Aurora, Elgin & Chicago R.R., plans, 1087
  Decree entered for C. & H. S. R., 968
  Grafton property sold, 754, 923
  Pittsburgh Rys., West End lines, 148, 221; Opposed, 298
  Second Av. R. R., New York City, 336
  U. T. & E. Co. Providence, R. I., 31
—Holding company, Weakness of [Frothingham], 584; Comments on, 577
—Investment, Railways as [Babson & Hill], 601
—Junior securities:
  Advantages of [Newman], 582
  Advocated, 29; Comments on, 191
  Marketing difficulties [Peirce], 872; Comments on, 931
  North American Co. plan, 110, 376; Comments on, 191
—Leadership by executives needed, Comments on, 463
—Market for securities [Addinsell], 592
—Money Increased cost of [Gruhl], 595
—New York railways, 962, 1003, 1043, *1065
—Operating revenue for 72 railways, *1047
—Problems of railways [Perry], 788
—Public utility bonds advocated, 72
—Railway credit [Gadsden], 17, 18
—Railways difficulties in medical terms [Barnes], 786
—Readjustment in New York City [N. Y. T C.], 557; Comments on, 579
—Receiverships:
  Discharged, Atlantic City, 70
  Discharged Denver & Interurban R.R., 149
  Discharged Rhode Island Co., 418, 454
  Discharged, West Virginia Tr. & Elec. Co., 377
  Proposed for Norton, Taunton & Attleboro Street Ry., 140
Financial:
—Receiverships (Continued):
  Saginaw-Bay City Railway, 296
  Sought for I. R. T., 376, 415, 455, Comments on, 345
—Renewal and depreciation allowances of various companies, 989
—Reorganization of Toledo Ry. & Lt. Co., 567
—Simple plan essential [Frothingham], 584
—Taxation (see Taxes)
—Tax exempt securities:
  Constitutional amendment against, Introduced, 1084; Comments on, 851, 1015, 1057
  Public utilities, Effect on [Gadsden], 212; [Addinsell], 593; Remarks on, 250; Report on [A. E. R. A. Com.], 622; Comments on, 191, 851, 1015, 1057
—Unsecured creditors wiped out in reorganization, 567
—Utility securities, Status of [Addinsell], 831; Comments on, 851
Finland:
—American cars purchased, *1074
Fires:
—Quenched by baking soda, 47
—Underwriters' laboratories and work [Muldaur] 594
Fixtures:
—Air sanders, *16
—Door and step control, *433
—Door guides welded to plate, *954, 1079
—Drawbars marked to prevent theft, *693
—Factors in sale of transportation [Litchfield], *491
—Life guard, *209
—Springs, Coiled type on one man cars, *97
—Springs for easy riding [Seelar], 275
—Springs, Hardening, *102, 290
—Steps, Folding, *1078
Foch honored by engineers, 1081
Fonda, Johnstown & Gloversville R.R. (see Gloversville, N. Y.)
Foreclosures (see Financial)
Fort Madison, Iowa (see under Iowa City, Iowa)
Fort Wayne, Indiana:
—Indiana Service Corporation:
  Improvement program, 216
  Interline traffic ["Observer"], *505
  Limited service extension, 260
  Wages decreased, 453, 564
Fort Wayne, Van Wert & Lima Traction Company (see Springfield, Ohio)
Fort Worth, Texas:
—Northern Texas Traction Co.:
  Accident to mule, 216
  Ball bearings, Economy from [Porter], 288
  Pit jack, *168
France:
—Bus lines aided by government, 768
—Midi Railway purchases equipment, 303, 423, 669
—Paris subway accident, *838
—Railway electrification planned, 189, 1042
—Railway strike, 1035
Franchises (see also Service at cost):
—Contracts discussed, 332
—Human element affects [Frothingham], 584; Comments on, 557
—Indeterminate permits [Newman], 582; Indorsed [Todd], 589
Freight and express:
—Accounting [A. E. R. A. A. Com.], 651; Discussion, 653
—Advertising for, by interurbans ["Observer"], 505
—Claim prevention [C. E. R. A.], 54; Comments on, 119
—Container system:
  Cincinnati road uses, *949
—Camden-Trenton service, 340
—Costs in Massachusetts, 41
—Delivery to door, *133; Comments on, 120
—Developing interurban business, *3
—Discontinued in Philadelphia, 845
—Facilities and methods in Mass., *41
—Merchandise delivery proposed [Barnes], 998
—Milk handling record, 996
—Motor truckers aid trolleys, 41
—Railways as freight distributers, *242; Comments on, 229
—Subway transportation in New York, Proposal, 710
—Supplementing steam trunk lines [Bibbins], 591; [O'Toole], 878
—Terminals for, *41
—Trucks regulated in California, 969
Fresno, California:
—Fresno Traction Co.:
  Franchise grant presented, 215, 331, 1158
  Wages decreased, 1155
Fuels:
—Coal (see also Market conditions):
  Consumption by users, 201
  Costs in New York City, 1115
  Labor situation, Comments on, 724
  Production cost and effect on business, Comments on, 229
  Property sold by railways, 966
  Pulverized [Savage], 172, 629
  Pulverized anthracite, Burning of [Rau], *945
  Purchase advised, 143, 227
  Treating dirty coal, 245
—Oil supplanting coal, 25, 214
—Petroleum:
  Situation of industry, 245

## G

Galesburg, Illinois:
—Galesburg Railway, Lighting & Power Company:
  Franchise sought, 1157
Gallipolis, Ohio:
—Gallipolis & Northern Traction Co.:
  Gasoline rail car, 927

Galveston, Texas:
—Galveston Electric Co.:
Fare controversy, 836
Gary, Indiana:
—Gary Street Railway:
Local financing, 321; Comments on, 306
Gear and pinions:
—Helical gears [Phillips & Holy], *22; Comments on, 1
—Helical gear, Tooth contour of, *168
—Lubrication of [Morrow], *674
—Manufacturer's Assn. meets, 656
—Shrinking pinions on, 23
Georgia Railway & Power Co. (see Atlanta, Ga.)
Georgia, State of:
—Utility information bureau formed, 65
Germany:
—Berlin:
Eight-ride ticket, *143
Railway situation [Eichel], *814; 881
—Cologne, Curves of tramway development [Ertel], *199
—Hamburg Elevated Railway:
Changes and statistics [Mattersdorff], *979
—Hamburg's trackless trolleys [Schiemann], 1023
—Interurban cars, Steel, 169
—Railway situation, *358
—Single phase electrification favored, 14
Glens Falls, N. Y.:
—Hudson Valley Railway:
Annual report, 29
Gloucester, Mass.:
—Motor bus transportation, *773
Gloversville, N. Y.:
—Fonda, Johnstown & Gloversville Railroad;
Strike, One-man cars, 145
Grafton, W. Va.:
—Grafton Light & Power Co.:
Property sold, 754, 923
—Tygarts Valley Traction Co.:
Customer-ownership stock, 923
Grand Rapids, Mich.:
—Commonwealth Power, Railway & Light Co.:
Annual report, 1006
—Grand Rapids, Grand Haven & Muskegon Ry.:
Auto competition, 339, 884
Rental in Muskegon raised, 664
—Grand Rapids Railway:
Franchise proposals, 333, 563, 1083
—Jitney situation, 420, 1083, 1130
—United Light & Railways Co.:
Securities, sales methods [Weeks], 65
Great Britain:
—Bradford trackless trolleys [Jackson], *859: Comments on 851
—Cardiff (Wales) buses lose, 971
—Coal strike and effect, 25, 241
—Edinburgh Corporation Tramways:
Cars and buses, *13, *51
Overhead construction started, *827
—Glasgow Corporation Tramways:
Annual report, 214, 219
—Leeds City Tramways reports deficit, 916
—Leeds, Trackless trolleys in [Jackson], *859; Comments on, 851; Front-drive bus, 1036
—Letters from, 25, 214, 370, 561, 916, 1000
—Liverpool installs daylight color light signals, 1150
—London:
London County Council Tramways:
Annual report, 214
London General Omnibus Company:
Motor coach features, 827
New service planned, 183
London Underground Railway:
Lighting subway connections, 399
Posters, etc., *137, *506
Metropolitan District Railway:
Trip-cock testing, *829
Metropolitan Railway
Automatic stop on signal, 432
Locomotive reconstruction, 694
Railways' report, 111
Subway construction proposed, 996
—Railroad labor problems, Handling, 366
—Railway electrification standards report, 826
—Tees-side trackless trolley system [Jackson], 1027
—York trolley buses, 772; [Jackson], *1027
Greenfield, Massachusetts:
—Connecticut Valley Street Railway:
Bus operating costs, 777
Freight operation, *41
Receiver sought, 1129
Greenville, Texas:
—Municipal buses for transportation, 969

## H

Hagerstown, Maryland:
—Hagerstown & Frederick Railway:
Rerouting requested by patrons, 1091
Hamilton, Ohio:
—Cincinnati & Dayton Traction Co.:
Interurban crash, *1086
Harbirshaw Electric Cable Co., receivership, 1135
Hartford & Springfield Street Railway (see Warehouse Point, Conn.)
Haverhill, Massachusetts:
—Massachusetts Northeastern Street Railway:
One man cars approved, 845
Wages decreased, 293
Headwaygraphs in Brooklyn, [Roberts], *440
Heavy electric traction (see also Locomotives):
—American practice an influence abroad, 855
—Australian extension, 462
—Buffalo, N. Y., requests plans for, 796, 918
—Chilean order, 576, 670, *991
—Committee report on [A. E. R. E. A. Com.], 626; Discussion of, 627
—Considered on Pacific Coast, 144
—Definition of needed ["Engineer, H.E.T."], c443
Heavy electric traction (Continued):
—Direct current, 1,500 volts, recommended for Holland, 761; [Martinet], 988
—Direct current 3,000 volts for Chile, 576, *991
—Direct current recommended for England, 826
—Extensions planned, World survey of, 351
—Factors affecting, 84
—France plans, 1042
—Heating by electric boilers [Rosenberger], *206; *829
—Holland [Martinet], 988
—Jamaica proposes, 100
—Madagascar plans, 669
—Paris-Lyons-Mediterranean Co. proposes, 189
—Saving on N.&W., 238
—Single phase system:
Germany endorses, 14
Sweden extends, 14
—Spanish contract, 1055
—Standardization report in England, 826
—Superpower survey, proposes, *819; Comments on, 808
—Switzerland, Status of [Huber], *988
—Three-phase extension in Italy [Huldschiner], *816
Helena, Montana:
—Helena Light & Railway Company:
Fare increase sought, 537; Granted, 925
Highways:
—Legislation before Congress, 108
—Research on, 174
Highwood, Illinois:
—Chicago, North Shore & Milwaukee R.R.:
Advertising for traffic ["Observer"], *505
Americanization work, *332
Christmas greetings, *1116
Delivery of merchandise in Chicago, *133; Comments on, 120
Safety record, 238, 718
Wages decreased, 69
Holland:
—Direct current, 1500 volts recommended, 761; [Martinet], 988
Holyoke, Massachusetts:
—Holyoke Street Railway:
Chicopee fare question, 1162
Freight operation, *41
Housing, Relation to traffic [Ertel], *199
Houston, Texas:
—Houston Electric Company:
Fare controversy, 969, 1010
Service at cost proposed, 145, 333, 563; Defeated, 662; New franchise, 838; Defeated 969; New proposal, 1044, 1083
Hudson Valley Railway (see Glens Falls, N. Y.)
Humboldt Transit Company (see Eureka, Cal.)
Huntington, West Virginia:
—Ohio Valley Electric Railway:
Extension financing difficult, 711
Pump house for power plant, *387; Comments on, 385

## I

Illinois Electric Railways Association:
Annual meeting, 746
Illinois Public Utility Information Com. work, 332, 1064, 1092
Illinois, State of:
—Bus petition refused, 758
—Regulation of motor vehicles, 184, 747
—Utility legislation, Comments on; 39
Illinois Traction System (see Peoria, Ill.)
India:
—Electric railway development, 1013
—Electric railway project, 847
—Northwestern Railway electrification factors, 84
Indiana, Columbus & Eastern Traction Company (see Cincinnati, Ohio)
Indiana Electric Corp. (see Indianapolis, Ind.)
Indianapolis, Indiana:
—Belt railway proposed, 1161
—City railway controversy, 108, 292; Comments on, 386
—Freight handling plans, 334
—Indiana Electric Corporation:
Merger of utilities sought, 295, 377, 415, 569, 965, 1048
Valuation figures attacked, 377, 415
—Indianapolis Street Railway:
Fare situation, 108, 224, 667, 970, 1117; Comments on, 386
Paving question, 879, 1084
Rerouting financially impossible, 150
Wages decreased, 215
—Interstate Public Service Company:
Bond selling difficult, 1127
Freight facilities and business, *3
Purchases Connersville, Ind., company, 1007
Through service attracts traffic ["Observer"], *505
Wages decreased, 215
—Jitney situation, 150, 379, 970, 1084, 1132; Comments on, 386
—Loading platforms, *1147
—Terre Haute, Indianapolis & Eastern Traction Co.:
Wages decreased, 215
Indiana Public Utility Association:
——Indiana University to entertain, 1119
Indiana Railways and Light Company (see Kokomo, Ind.)
Indiana Service Corporation (see Ft. Wayne, Ind.)
Indiana, State of:
—Rate reduction not probable, 1092
—Utility merger proposed, 295, 377, 415; Denied 569; Rehearing sought, 965
Information bureaus of utilities (see Public, Relations with)
Insulating materials:
—Fiber, Strength of, 135
—Specifications for [A.S.T.M.], 103
—Testing of [Dean], 85; Comments on, 79
Insurance:
—Mutual company formed, 254
Interborough Rapid Transit Co. (see New York City)
Internationale Strassenbahn und Kleinbahn Verein:
—First convention, 66, 358
International Railway Association:
—Meeting planned, 1119
International Railway (see Buffalo, N. Y.)
Interstate Commerce Commission (see Public service and regulative commissions)
Interstate Consolidated Street Railway (see Attleboro, Mass.
Interstate Public Service Company (see Indianapolis, Ind.)
Interurban cars (see Cars, Interurban)
Interurban railways:
—Advertising for traffic ["Observer"], *505
—Automatic substations instead of single phase, *543
—Bridge for Canadian railways proposed, 1157
—Car designs, *6
—Freight business, Developing, *3
—Limited service extension in Ohio, 260
—Limited service from Milwaukee, 412
—Time table arrangement, *394
—Traffic possibilities, Comments on advertising for, 465
Iowa City, Iowa:
—Mississippi Valley Electric Company:
Five-cent fare success in Ft. Madison, 420
Iowa Electric Railway Association:
—Meets with Iowa section N.E.L.A., 65, 104, 174
—Mid-year meeting:
Papers and discussion; 527
Program, 369, 410
Italy:
—Crowded cars, *90
—Trackless trolley, for army use, 1026
—Valtellina Railway extension [Huldschiner], *816
—Valtellina Railway locomotive rheostat, 439

## J

Jackson, Michigan:
—Michigan Railroad:
Auto competition from Saginaw, 667
Fare increase, 459
Holland-Macatawa fares, 845
Interurban fare controversy, 373
—Michigan United Railways:
Discontinuance threatened in Lansing, Mich., 378
Fare decrease unsuccessful, 224
Interest defaulted, 922
Paving relief urged, 658
Jacksonville, Florida:
—Jacksonville Traction Company:
Relief from city assessments sought, 800
Wages reduced, 179
Jamaica:
—Electrification proposed, 100, 265
Jamaica, New York:
—Bus operation from Flushing, 883
Jamestown, New York:
—Jamestown Street Railway:
Payment on gross earnings necessary, 919
Wages decreased, 1155
Japan:
—Electric railways planned, 37, 265, 343, 806, 975, 1136
Hydro-electric development, 669
Jersey City, New Jersey:
—United Railways Investment Company:
Reorganization considered, 1047
Jitneys (see Motor buses)
Johnstown & Somerset Railway (see Somerset, Pa.)
Joliet, Illinois:
—Chicago & Joliet Electric Railway:
Monthly pass, 1051
Wages decreased, 69

## K

Kansas City, Missouri:
—Jitney regulations, 261, 419, 573, 1131
—Kansas City Railways:
American Legion convention, 796, *879, *951
Employees activities, 254, 750
Fare increase request withdrawn, 843
Freight distributing to Westport, *242; Comments on, 229
Receivership progress, 219
Rerouting, 380; Difficulties in Kansas City, Kansas, 1049
Service improvements [Buffe], *475
Tax reduction urged, 70
Universal loop, *725
Kenosha, Wisconsin:
—Weekly pass [Jackson], *203; Comments on, 191
Kentucky, State of:
—Buses extend traction, 152
—Utility Association meets, 874, 994
Kentucky Traction & Terminal Co. (see Laxington, Ky.)
Kentucky Utilities Company (see Somerset, Ky.)
Knoxville, Tennessee:
—Knoxville Railway & Light Co.:
Engineering advice contract abrogated by commission, 73
Fare increase, 33, 73, 152
Kokomo, Indiana:
—Indiana Railways and Light Company:
Value of, 881

## L

Labor (see also Employees):
—Railroads in Great Britain, Methods, of handling, 366
—Railroad strike threatened, Comments on, 724
—Readjustment situation, Comments on, 723

Labor (Continued):
—Right to organize, 1044
—Unemployment conference, 660, 686; Comments on, 541
Lafayette, Indiana:
—Railway to be rebuilt, 752
—Rehabilitation plan fails, 298
Lake Shore Electric Railway (see Cleveland, Ohio)
Legal:
—Accident to mule in Texas, 216
—Fare case to Supreme Court, 837
—Legal notes, 186, 263, 803, 1163
Legislation for railways:
—Illinois measures, Comments on, 39
—National [A. E. R. A. Com.], 617
—Service at cost in Wisconsin, 146
—Track abandonment bill vetoed, 149
Lexington, Kentucky:
—Kentucky Traction & Terminal Company:
  Fares decreased, 1162
Lighting:
—Indirect in London subways, 399
Lima, Ohio:
—Western Ohio Railway:
  Receivership sought, 1008
Lincoln, Nebraska:
—Jitney situation, 564
—Lincoln Traction Company:
  Eight cent fare continued, 183
  Passenger decrease, 1132
Little Rock, Arkansas:
—Little Rock Railway & Light Company:
  Crossing, Permanent brick, •16
  City to appraise, 220, 379
  Fare controversy, 379
  Metal ceiling for head lining, 96
Living costs:
—Akron, Ohio, 51
—Fares compared to [Burke], •94
—Retail price of food, Changes, 442, 1071
—Utility services, Percent for, 202
—Wage reductions by industries, 361
Loading platforms (see Waiting stations)
Locomotives:
—Brake equipment for Paulista Ry., 828
—Exporting of, 887
—Features of electric, Comments on data on, 305
—Metropolitan Railway of London reconstructing, 694
—N. Y. Municipal Ry., Features, •141
—Production in 1919
—Single-phase for Swiss Federal Railways, 825
—Steam versus electric, 84
—Switching, Built by operating company, •246
—Three phase type, 439; [Huldschiner], 816
—Tidewater Southern Ry., Features, •326
—Water rheostat, New type, 439
London, Ontario, Can.:
—London Street Railway:
  Paving dispute, 712
London (see Great Britain)
Long Island Railroad (see New York City)
Los Angeles California:
—Los Angeles Railway:
  Abandonment of Washington line permitted, 418
  Bonus award, 917, 1155
  Fare increase sought, 184, 380
  Maps of danger points, 184
  Safety compared with courtesy, 420
  Safety first teaching by fairy tales, 757
  Seniority for safety car operators, Separate, 1162
  Substation relief, 1112
  Wages decreased, 659, 709
—Pacific Electric Railway:
  Abandonment of lines sought, 257, 455
  Bus competition hearing, 1052
  Fare increase sought, 380, 1010
  Hollywood tunnel proposed, 68
  Improvement program, 795
  Long Beach service proposed, 419
  Safety score, Perfect, 419
  Shaving exhaust system, •869
  Valuation, 568, 1153
  Wages decreased, 659, 709
  Waiting station as advertisement, •906
  Zone system proposed, 756
—Safety tunnel, •870
—Terminal rehearing, 26
Louisville Kentucky:
—City-railway controversy, 152, 183, 259, 800, 883 1132
—Louisville & Interurban Railroad:
  Milk handling record, 996
—Louisville Railway:
  Accident reduction Prizes for, •131
  Bank publicity for, •136
  Dividends of service, •135
  Employee as director, 1158
  Exhibit at state fair, •956
  Fare increase Effect of, 455, 754
  Jan.-Sept. report 1008, 1087
  Safety work Co-operative, 997
  Wages decreased, 840, 877
  Weekly pass considered, 924
Louisville & Northern Railway & Lighting Company (see New Albany, Ind.)
Lubrication:
—Effect on maintenance [Treat], 914; Comments on, 889
—Properties and application of lubricants [Morrow], •674
—Uses of and precautions [Treat], 914
—Vacuum oiler •781
Lynchburg, Virginia:
—Lynchburg Traction & Light Co.:
  Fare increase denied, 299

M

Madagascar:
—Electrification plans, 669
Mail pay:
—Committee report on [A. E. R. A.], 613; Comments on, 763
Mail pay (Continued):
—Postmaster-General reports, 1071.
Maine, State of:
—Regulation of jitneys, 261
Maintenance practice:
—Crossings, Permanent brick, •16
—Graphic records aid, •1139
—Influence on car rider [McWhirter], •489
—Lubrication influences [Treat], 914; Comments on, 889
—Montreal methods, •193; Comments on, 192
—Systematic advocated [Dean], •278
Management:
—Business common sense needed [Gadsden], 581
—City operation planned in Meridian, Miss., 961
—Contract condemned in Columbus, Ohio, 714
—Department heads, Service through [Boyce], 131
—Engineering training for, Comments on, 763
—Function of with respect to regulation [Pellissier], 784
—Individual dispatching, Comments on, 889
—Relationship to men [Barnes], 480
—Sales ability of [Goodwin], •466; Comments on, 578
—Value of knowing public officials, Comments on, 119
Manhattan & Queens Traction Co. (see New York City)
Manila Electric Company (see Philippine Islands)
Manistee, Michigan:
—Manistee Railway:
  Financial difficulties, 335
  Franchise forfeited, 1002
  Service suspended, 416, 667, 799
Marion, Indiana:
—Marion & Bluffton Traction Co.:
  Wages decreased, 178
Market conditions:
—Brake shoes, 78
—Brushes, Carbon, 930
—Building situation, 303
—Business, General, 265, 721; [McGraw], 835, 929, 988, 1055
—Car company, Foreclosure sought, 888
—Car seats, 36
—Cement, 117, 189, 343, 539, 761
—Coal, 189, 227, 343, 423, 670, 722, 806, 847, 1056
—Coil winding machines, 36
—Conduit, 575
—Copper, 461, 669, 721, 806, 930, 1096, 1165
—Cord, 761
—Cotton, 540
—Cross arms, 423
—Electrification materials as reparations, 1165
—European business [Sawtelle], 887
—Exports, Comments on effect of exchange, 1016
—Fenders, 1135
—Freight cars, 265, 1165
—Frogs, 265
—Gear cases, 539
—German rehabilitation, 887, 1055
—Heaters, 384
—Insulating materials, 721, 1165
—Insulators, 156, 227, 761, 888
—Iron, Malleable, 929
—Jacks, 36
—Lamps, 227
—Lightning arresters, 37
—Line hardware, 156, 462, 1096
—Locomotives, 887
—Lubricants, 77
—Metal market, 37, 227
—Motor repair parts, 461
—Motors, 155, 847
—Poles, Steel, 155
—Poles, Wood, 189, 423, 761, 1096
—Rails, etc., 190, 805
—Railway materials, 37, 383 575, 722; Export, 37; Brazil, 575
—Resistors, 1055
—Shop tools, 36, 540
—Steel, 77, 539, 721 975; Sheets 722, 1013
—Storage batteries, 343
—Tariff on electrical goods, 77
—Tool handles, 77
—Track material, 117
—Track tools, 36
—Trade situation, 117
—Ventilators, 36
—Wages, General Electric Co., 888
—Westinghouse Company buys Seattle plant, 929
—Wire, 189, 265, 424
—Wiring materials, 117
Market Street Railway (see San Francisco, Cal.)
Marquette, Michigan:
—Marquette City & Presque Isle Railway:
  Financial difficulties, 1007
Maryland, State of:
—Bus situation [Whitman], 790
—Safety campaign, 300
Massachusetts Northeastern Street Railway (see Haverhill Mass.)
Massachusetts, State of:
—Transportation cost investigation, 564
Memphis Tennessee:
—Memphis Street Ry.:
  Fares Tickets discontinued, 339
  Public informed, 919
  Receivership may be ended, 336
  Track rebuilt on old ties •97
  Wage decrease proposed 144
Merchandising transportation (see also Publicity, Traffic stimulation):
—Advertising advantages of railway 718
—Advertising by interurbans ["Observer"], •505
—Advertising principles [Boyce], •167, •353
—Advertising, Trend of [Soules], 748
—Bargain sale of street car rides [Boyce], •353
—Buses as a factor, Comments on, •514
—Car design features a factor [Litchfield], •491
Merchandising transportation (Continued):
—Car equipment a factor [McWhirter], •489
—C. E. R. A. Committee report, 61; Discussion, 55, 104
—Chicago pageant exhibits, •360
—Competition versus legal battles [Putnam], 444
—Courtesy of employees affects [Morgan], •499
—Creating the desire to ride [Emery], c827; Comments on, 890
—Department heads, Service through [Boyce], •131
—Education [A. E. R. T. & T. A. Com.], 644; Discussion, 645
—Elements necessary [Brown], •61; [Weedon], 64
—Employees, Relationship of [Barnes], 480
—Employees should be satisfied [Kelsay], 64
—Employees, Talks to [Bigelow], •1111, 1143
—Inspiring employees, 421
—Lessons from other industries, Comments on, 880, 1058
—Mechanical man's part [Gunn], 104
—Necessity of, Comments on, 463, 578
—Sales manager, Value of [Goodwin], •466; Comments on, 578
—Sales practice [Warren], 985; ["Observer"], c1072
—Service as an aid [Buffe], •475
—Service before advertising [Emery], c827; Comments on, 890
—Service meets competition [Rodgers], 63
—Speed and frequency of cars a factor [Morgan], •499
—Stations helpful, •1146
—Track maintenance a factor [Dunham], •484
—Value of "good talker," Comments on, 425
—Weekly pass in Youngstown, •899
Meridian, Mississippi:
—Meridian Light & Railway Company:
  City operation planned, 961
Metals:
—Aluminum, Machining of, 448
—Cadmium-copper trolley wire, 277
—Iron:
  Cast iron, Corrosion in alkaline soils [Smith and Shipley], 911
—Steel:
  Case hardening, Features of, 242
  Molybdenum steel, Properties of, 910
  Specifications for [A. S. T. M.], 103, 174
  Titanium-treated, 248
Miami, Florida:
—Miami Traction Company:
  Future of, 796; Comments on, 192; City to purchase, 920
Michigan City, Indiana:
—Chicago, Lake Shore & South Bend Railway:
  Shop economies, •692
Michigan Railroad (see Jackson, Michigan)
Michigan United Railways (see Jackson, Mich.)
Middlesex & Boston Street Railway (see Newtonville, Mass.)
Milford, Massachusetts:
—Milford, Attleboro & Woonsocket Street Ry.:
  Freight operation, •41
Milwaukee, Wisconsin:
—Milwaukee Electric Railway & Light Co.:
  Extension without paving costs, 375
  Historical celebration, •27
  Limited interurban service, 412
  One man or two man safety cars, 299; [Mullet], 620, •933
  Rerouting plans, 757, 1054
  Service-at-cost proposed, 146, 253
  Snow-fighting equipment, •857
  Stock sale, •110; Comments on, 191
—One man car controversy, 299; Approved by Safety Com., 570, 845
Minneapolis, Minnesota:
—Electric Short Line Railway:
  Wages decreased, 794
—Minneapolis, Anoka & Cuyuma Range Ry.:
  Local passengers must be carried, 970
—Minneapolis, Northfield & Southern Railway:
  Electrification proposed, 27
—Minneapolis Street Railway:
  Co-operation of city sought, 710
  Fare hearing, 223; Increase allowed, 341, 380; Prevented, 457, 536
  Street calling practice, 919
  Valuation sought, 33, 183
—Twin City Rapid Transit Company:
  Fair crowds provided for, 457
  Financial plans, 149
  Mutual benefit association [Anderson], 1118
Mississippi Valley Electric Company (see Iowa City, Iowa)
Mobile, Alabama:
—Mobile Light & Railroad Company:
  Wages dependent on fare, 565
Monongahela Power & Railway Co. (see Fairmount, W. Va.)
Montgomery, Alabama:
—Montgomery Light & Traction Co.:
  Receiver resigns, 219
Montreal, Quebec, Can:
—Montreal Tramways:
  Annual report, 417, 664
  Betterments in 1921, 1087
  Bond issue, 1046, 1087
  Capital question, 71
  Shop economies, •193; Comments on, 192
  Wage decrease proposed, 177, 217, 252, 294, 334, 566
—Subway proposed, 711
Motor buses:
—Accounting system proposed in California, 878
—Advantages over trolley car [Pearson], 866
—Ally or competitor of railway [Gluck], 856
—Baltimore installs new type, •778
—California, report on, 883
—Columbus Ohio service, 1052
—Comparative cost with safety car, and trolley bus [Simmon], •394; [Stocks], •517; [Thirlwall], •546; [Andrews], 769; [Stocks], 771

Abbreviations: •Illustrated. c Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Motor buses (Continued):
—Competing buses refused certificate, 758
—Competition by, in Great Britain feared, 916
—Competition situation, Discussion [I. E. R. A.], 747
—Features of Oil City bus, *318
—Flushing-Jamaica, N. Y. line, 883
—France aids interurban lines, 768
—Future of, Comments on, 764
—Gloucester, Mass., Transportation by, *773
—Great Britain uses, 370
—Illinois grants petition, 716, 844
—Interurban service from Bloomington, Ill., 801
—Jitney situation:
    Albany, N. Y., 261, 413, 456, 665, 717, 1124
    Alton, Ill, 338
    Boston, Mass., 843, 844, 925, 969
    Bridgeport, Conn., 419, 456
    Burdens proposed, 17
    Camden, N. J., 1132
    Cincinnati, Ohio, 537
    Connecticut, 50, 74, 75, 113, *151, 184, 223, 262, 301, 380, 419, 456, 757: Comments on, 40, 158
    Circumventing orders, Comments on, 345
    Columbus, Ohio, 801, 1052
    Dayton, Ohio, 450, 1091
    Decatur, Ill., 927
    Des Moines, Iowa, 107, 144, 150, 218, *237, *283, 325, 792, 1153; Comments on, 267
    "Free" buses illegal, 1132
    Grand Rapids, 420, 1130
    Grand Rapids interurbans object, 339, 884
    Indianapolis, Ind., 150, 379, 970, 1084, 1132; Comments on, 386
    Kansas City, Mo., 261, 419, 573, 1131
    Lincoln, Neb, 564
    Los Angeles, Cal., 1052
    Muncie, Ind., 339, 801, 927
    Muskegon, Mich., 1048, 1130
    Newark, N. J., 261, 719, 789, 884
    New Jersey, 789, 1051, 1162
    Newport News, Va., 716
    Oklahoma, 375, 537
    Pasadena, Cal., 373
    Richmond, Va., 1005
    Rockford, Ill, 333, 884
    Saginaw, Mich., 296, 323, 373, 453, 530, 659, 667
    Seattle, Wash., 224, 260, 373, 412, 457, 571, 664, 666, 716, 926, 971, 1010, 1011 1093, 1131
    Sioux City, Iowa, 222
    Spokane, Wash., 300
    Springfield, Mo., 570
    Street cars compared, 333
    Tacoma, Wash., 759, 801
    Toledo, Ohio, 150, 381, 659, 1005, 1052
    Transportation monopoly, Comments on, 305
    Tulsa, Okla., 457
    Weekly pass affects, *1104
    Wheeling, W. Va., 261, 380
—Long road test, 864
—Necessity in transportation field [Jackson], c523
—New York applicants, 884
—New York City, Proposed extension, 566
—New York City starts new route, *114
—Operating at loss, Cardiff, Wales, 971
—Operating costs in California, *319
—Operators admitted by Amalgamated, 556; Comments on, 673
—Regulation of, Discussion [N. A. R. U. C.], 789
—Regulation of, State:
    California, 1090
    Connecticut, 50, 74, 75, 113, *151, 184, 262, 301, 380; Comments on, 40, 158
    Illinois, 184
    Maine, 261
    Maryland [Whitman], 790
    Nebraska, 1130
    New Jersey [Osborne], 789
    Ohio, 224, 340
    Washington, 184; [Koykendall], 789
    West Virginia, 666
—Replace trolleys on Niagara line, 536
—Republic Truck Co. to build, 138
—Roads provided by railways, 1092
—Rubber spring blocks, *141
—Safety necessary, Comments on, 464
—Service extension in London, 183
—Supplementary to railways:
    Akron, Ohio, 565
    Applying to abandoned lines, Comments on, 2
    Coal saving in early morning, *51; Comments on, 1017
    Conn. Co., 75, 113, *151, 757, 801; Unprofitable, 879
    Cost comparisons [Jackson], *315
    Cost of operation, 777
    Danbury, Conn., 381, *516, `556, 1121
    Data on, 319
    Edinburgh bus, *12
    European observations [Sawtelle], 887
    Interurban extension, 757, 885
    Oakland, Cal., 340
    Owl service, Comments on, 1017
    Oil City, Pa., *318
    Reasons for, Comments on, 2, *514; [Todd, by Bozell], 1018
    Rockford, Ill., 884
    Springfield, Mo., 570
    Toronto establishes route, *867
    Tulsa, Okla., plans, 218
—Test, Long road, 864
—Transportation, Comments on "Bus Transportation," 704; Discussed, 1036, 1149
—Underslung body in New York City, *202
—Urban transportation by:
    Gloucester, Mass., *773
    Saginaw, Mich., 796

Motor cars, Gasoline:
—Adopted by N. Y., N. H. & H. R.R., 749
—Gallipolis, Ohio, purchases, 927
Motor, Polyphase commutating, 732
Motors:
—Armature dipping and baking, 525
—Armature repair records, *783
—Construction of [Dean], *427
—Field coils, Flow method of impregnating, *1078
—Field coils, Reinsulating and repairing [Hester], *14
—Field jumpers, Wrapping of, 893
—Leads to car body, Installing, *1148
—Shaft repaired by welding, *1073
—Temperatures, with and without trailers [Woods], *395
—Testing detail parts [Dean], *427
Motor trucks:
—California regulates freight-carrying, 969
—Freight haulage in New England, 311
—Merchandise, Hauling for railways, *133
—Speed and weight allowances, 358
—Trolley freight aided by, 41
Moving pictures (see under Publicity)
Muncie, Ind.:
—Jitney situation, 339, 801, 927
Municipal ownership:
—Advantage to Seattle in future, 919
—City participation in utility affairs [Prendergast], 710
—Eureka, Cal., authorizes, 149
—Financing methods, Comments on, 192
—Miami, Fla., to purchase railway, 920
—New York City denied, 1157
—Private operation proposed for New York City [N. Y. T. C.], 557; Comments on, 579
—Private ownership preferred by Utility Commissioners, 871
—Proposed for:
    Amarillo, Texas, 878
    Washington, D. C., 68
—Proprietary capacity of municipality, 876
—Review of [Gruhl], 595
—Tendency away from [Todd, by Bozell], 1018
—Toronto, Ont., takes over railway, 411
—Trackless trolley in Staten Island, *689
Muskegon, Mich.:
—Muskegon Light & Traction Co.:
    Suspension of service allowed, 1048
—Vote in favor of railway, 1130; Comments on, 1098

N

Nashville, Tennessee:
—Nashville Interurban Railway:
    Extension by buses, 757, 885
—Nashville, Railway & Light Company:
    Fare increase, 153
—Traffic survey, 566
National Association of Railway & Utility Commissioners:
—Annual meeting:
    Papers and proceedings, 696, 708, 787-791, 871
    Program, 449
—Private ownership of utilities recommended, 871
National Safety Council:
—Annual convention:
    Papers and proceedings, 655, 744, 745, 785
    Place, 369
    Program, 449
Nebraska, State of:
—Regulation of motor buses, 1130
New Albany, Indiana:
—Louisville & Northern Railway & Lighting Company:
    Ten-cent fare unreasonable, 1049
Newark, New Jersey:
—Jitney situation, 261, 719, 789, 884, 1162
—Public Service Corporation:
    Additional customer-ownership stock offered, 921
    Stock offering successful, 376
—Public Service Railway:
    Fare controversy 73, 95, 109, 113, 260, 339, 458, 534, 573, 717, 755, 793, 843, 883, 992, 925, 1050, 1091, 1131
    Eight-cent fare, 922, 925, 1050, 1131
    June report, 220
    Motor buses proposed, 69
    September report, 880, 922
    Transfer charge, 223
    Valuation argument, 95, 109, 112; Comments on, 80
New Brighton, Pennsylvania:
—Beaver Valley Traction Co.:
    Police instructions, 393
    Publicity of [Boyce], *131, *166, *353
    Wages decreased, 179
    Zone checks on one man cars, *953
New Brunswick Power Co. (see St. Johns, N. B., Can.)
New England Street Railway Club:
—Annual outing, 146, 210
—Committee personnel, 24
—December meeting, 1038, 1081
—October meeting, 784
New Hampshire, State of:
—One-man cars indorsed, 1092
New Haven, Connecticut:
—Connecticut Company:
    Accounting forms [May], *398
    Annual outing, 176
    Annual report, 297
    Bridgeport fares decreased, 924, 970, 1051 1133
    Bus routes, 75 *151, 757, 801; Unprofitable, 879
    Fare decrease sought, 665, 759, 837, 883
    Fare decrease unlikely, 531
    Fare reduction trial, 844, 883, 885, 924, 970, 1011
    Financial status, 798, 927
    Hartford fare question, 925, 1126
    Jan.-Nov. report, 1128

New Haven, Conn.:
—Connecticut Company (Continued):
    Return to "New Haven" favored, 1088; Comments on, 1098
    Track labor costs [Wilson], *438
    Wage arbitration, 661, 751, 794
—Shore Line Traction Company:
    Operation of New Haven-Chester line, 1047, 1127
New Jersey & Pennsylvania Traction Co. (see Trenton, N. J.)
New Jersey, State of:
—Jitney situation, 789, 1051
—Regulation of Buses [Osborne], 789
—Transit Commission proposed, 1124
—Utilities Association meets, 998
—Utility law questioned, 224
New Orleans, Louisiana:
—City-railway controversy, 67, 108, 152, 176, 252, 256, 293, 335, 371, 412, 529, 749, 838, 917, 965
—Information on utilities sought, 1042
—New Orleans Railway & Light Co.:
    Financial proposals, 26, 1006
Newport News, Virginia:
—Jitney situation, 716
Newport, Rhode Island:
—Newport & Fall River Street Railway:
    Reorganization plans, 568
Newtonville, Massachusetts:
—Middlesex & Boston Street Railway:
    Wages decreased, 414
New York City (see also Brooklyn, N. Y.):
—Accidents in 1920, 376
—Bus proposal, *566
—City to examine transit plan, 1156
—Commuters, Traffic due to [Turner], 1151
—Coal cost statistics, 1115
—Eighth Avenue Railroad:
    Drawbars marked, *693
    Property suit, 377
    Repair shop reconstructed [Westlake], *897
—Emergency Bus System:
    Grand Concourse route, *114
    Suit against operation, 183
    Underslung omnibus, *202
—Fares, Attitude of political candidates, 711, 839, 877; Comments on, 849
—Federal Light & Traction Co.:
    Readjustment planned, 1159
—Fifth Avenue Coach Co.:
    Generosity to wounded soldiers, 152
    Operating costs, 1123
—Freight in subways, Proposal of, 710
—Interborough Rapid Transit Company:
    Annual report, 799
    City suit on construction costs, 218
    Directors object to hearing of N. Y. T. C., 1003; Comments on, 977
    Dividend question, 1003; Comments on, 977
    Featherweight pressure gates, *940
    Finances considered by N. Y. T. C., 962, 1003, *1065
    Housing plans, 375
    Financial organization, 1003
    Notes extended, 257
    Rear end collision, *919
    Receivership sought, 376, 415, 455; Comments on, 345
    Stock and bond values, *1065
    Transit situation [Harkness], 403; Comments on, 385
    Wage decrease proposed, 107
    Wage decrease, 177; Comments on, 157
—Long Island Railroad:
    Signal system for expediting train service, 399
    Single phase railway veterans [Jones], *907
—Manhattan & Queens Traction Co.:
    Operation profitable, 181
—Municipal line denied, 1157
—New York Municipal Railway:
    City suit on construction costs, 218
    Freight locomotive, *141
—New York & North Shore Traction Co.:
    City desires to operate, 181
—New York Railways:
    Wage reduction, 254
—New York, Westchester & Boston Railway:
    Annual report, 297
—North American Co.:
    Financing plans, 110, 376; Comments on, 191
—Ocean Electric Railway:
    Rockaway jitney illegal, 572
—Police traffic regulations [O'Brian], 603
—Power costs, 1156
—Railway history and tendencies [Harkness], 403; Comments on, 385
—Railway financial statistics, *1065, 1122
—Rapid transit in [Ridgway], 833
—Rerouting proposed [Turner], *1109; Comments on, 1097
—Second Avenue Railroad:
    Foreclosure ordered, 336
    Wood-working shop, *1075
—Staggered hours proposed, Comments on, 1138
—Staten Island:
    Trackless trolley extension proposed, 752
    Trackless trolley operation, *689; Comments on, 850
—Staten Island Midland Railway:
    December-June report, 147
    Report for year [Whalen], 1124; Comments on, 1097
—Subway bids asked, 847, 930
—Third Avenue Railway:
    Annual report, 968
    "Commendations," 138
—Traffic conditions, *941; [Turner], 1097, 1151
—Transit Commission:
    City to examine plan of, 1156
    Hearings planned, 661, 752, 877; Begun, 917, *941, 962, 1003, 1043, *1065, 1080, 1085, *1109, 1115, 1122, 1156; Comments on, 977, 1057, 1097

New York City:
—Transit Commission (Continued):
Preliminary report, 557, Comments on, 579, 808; Criticized, 1085; [Williams], 1080
Problem of [Harkness], 403; Comments on, 385
Traffic analysis, 824
Traffic expert, 1085
Transit program, 1126
New York, New Haven & Hartford Railroad:
—Annual report on trolleys, 297
—Losses by sale of Rhode Island trolleys, 1159
—Motor car adopted, 749
—Return of trolleys favored, 1088; Comments on, 1098
New York & Stamford Railway (see Port Chester, N. Y.)
New York, State of:
—Assessment of landowners for construction [Wehle], 552
—Bus applications, 884
—Interurbans plan bridge to Canada, 1157
—Railway Buffalo to Wellsville proposed, 1157
—Utica fare case, 535; Comments on, 464
—Workmen's compensation [Otis], 912
New York State Railways (see Rochester and Syracuse, N. Y.)
Niagara Falls, N. Y.:
—Niagara Gorge Railway:
Buses supplant trolley, 536
Bus service to Youngstown proposed, 719
Right-of-way offered for power rights, 711
Niagara, St. Catherines & Toronto Railway (see St. Catherines Ont. Can.)
Norfolk, Va.:
—Security sales to customers, *198
—Service-at-cost discussion, 215, 300
Norfolk & Western Railway:
—Savings by electrification, 238
Norristown, Pa.:
—Philadelphia & Western Railway:
Cars, *6
North American Co. (see New York City)
Northern Massachusetts Street Railway (see Athol, Mass.)
Northern Texas Traction Co. (see Fort Worth, Texas)
Northwestern Pacific Railroad (see San Francisco, Cal.)
Norton, Mass.:
—Norton, Taunton & Attleboro Street Railway:
Financial difficulties, 252
Norwalk, Ohio:
—Plymouth & Shelby Traction Co.:
Foreclosure sale ordered, 715, 965
—Sandusky, Norwalk & Mansfield Electric Ry.:
Foreclosure sale, 965, 1048
Portion may be operated, 1048
Norwich, Conn.:
—Shore Line Electric Railway:
January-September report, 1008
New Haven section sold, 841
Restoration of New Haven section planned, 663, 1047
September report, 841
Norwood Street Railway (see Birmingham, Ala.)

## O

Oakland, Cal.:
—San Francisco-Oakland Terminal Railway:
Bus operation, 340
Financial reorganization, 219
Safety car operation, 314
Segregation problem, 1007
Track construction table, 730
Wages decreased, 179, 294
Ocean Electric Railway (see New York City)
Ocean Shore Railroad (see San Francisco, Cal.)
Ohio Electric Railway (see Springfield, Ohio)
Ohio River Electric Railway & Power Co. (see Pomeroy, Ohio)
Ohio, State of:
—Bus law in effect, 224, 340
—Ohio Public Service Co.:
Consolidation details, 921
—Public Utility Information Committee:
Successful work, 920
—Railroads tax value increased, 415
—Six-cent fares predominant, 261
Ohio Valley Electric Railway (see Huntington, W. Va.)
Oil City, Pa.:
—Citizens Traction Co.:
Buses and routes, *318
Oklahoma, State of:
—Depreciation reserve fund opposed, 31
—Jitney regulation sought, 375, 537
—Traction property values, 664
Olean, N. Y.:
—Olean, Bradford & Salamanca Railway:
Merger and reorganization, 567, 753, 1159
—Western New York & Pennsylvania Traction Co.:
Reorganization planned, 567, 753
Omaha, Neb.:
—Omaha & Council Bluffs Street Railway:
Cars duplicated by Brazil, 659
Claim department's work [Connell], 525
Oven for armature coils [Norene], 442
Wage decrease advised, 452; Announced, 565; Accepted, 711
Omnibuses (see Motor buses)
One-man cars (see Cars, One-man)
Ontario, Canada:
—Temiskaming & Northern Ontario Railway Company:
Electrification proposed, 1125
Operating records and costs:
—Accounting, Service costs [Bowman], 700; Discussion [A. E. R. A. A.], 697
—Boston Elevated Railway, 533
—Buses and railway in Des Moines, 287
—Buses and safety cars compared [Simmon], *394; [Stocks], *517; [Thirlwall], *546; [Andrews], 769; [Stocks], 771
—Buses, California, *319
—Buses compared with shuttle cars [Jackson], *315

Operating records and costs (Continued):
—Buses, Greenfield, Mass., 777
—Freight costs in Mass., 41
—Increase of costs since 1912; Comments on, 542
—Maintenance records, *278, 1139
—Massachusetts investigating, 564
—Motor buses, Supplementary service, 777
—Power-saving recorders, Follow up [Wood], *681
—Salt Lake City, 347
—Trackless trolleys, 859, 1024, 1027
—Trucks and tractors for freight, *133
Oregon Electric Railway (see Portland, Ore.)
Ottawa, Ill.:
—Chicago, Ottawa & Peoria Railway:
Direct solicitation aids traffic ["Observer"], *505
Ottawa, Ontario, Canada:
—Ottawa Electric Railway:
Valuation for city, 149, 1006
Vote on future of, 1126
Overhead contact system:
—Cadmium-copper trolley wire, 277
—Construction, Discussion of A. E. R. E. A., 632
—Construction for trackless trolley, *689
—Eliminating half the poles, *687
—Features of D. M. Ry. construction *159
—Maintenance improved by graphic records, *1139
—Movable with track, *687
—Poles (see Poles)
—Preventing corrosion [Scott], *1079
—Strain ear, *327
—Trackless trolley loops and junctions [Jackson], *1027
—Trolley wire, Gaging for renewal [McKelway], 904
—Trolley wire qualities, Discussion of A. E. R. E. A., 633, c827
—Worn trolley wire, Relation of area and diameter [McKelway], 904

## P

Pacific Claim Agents' Association:
—Annual convention:
Elections, 449
Papers, 656, 792, 873-875
Subjects, 60
Pacific Electric Ry. (see Los Angeles, Cal.)
Pacific Gas & Electric Company (see Sacramento, Cal.)
Pacific Railway Club:
—Annual electric railway night, 410, 743
Painting (see Repair shop practice)
Parks:
—Philadelphia Rapid Transit Co. plans another, 292
Pasadena, California:
—Jitney situation, 373
Patent Office situation, Comments on, 1097
Pavements:
—Asphalt, Cutting device for, *291
—Brick standardization, *994; Comments, 978
—Compressed concrete in Detroit, *121
—Specifications proposed [A. S. M. I.], 830; Comments on, 807
Pennsylvania Electric Association:
—Annual convention, 212
Pennsylvania-Ohio Electric Co. (see Youngstown, Ohio)
Pennsylvania, State of:
—Commission History and work of, *163
Pennsylvania Street Railway Assn.:
—Annual meeting, 17
Peoples Street Railway (see Dayton, Ohio)
Peoria, Illinois:
—Illinois Traction System:
Advertising for traffic ["Observer"], *505
Financial plans, 841
Letter writing contest, *374
Transmission line construction, *1070
Maintenance improved by graphic records, *1139
—Peoria Railway:
Safety cars proposed, 537
Safety car publicity, *955
—Transportation growth, *33
Philadelphia, Pennsylvania:
—American Railways:
Condenser pump house at Kenova, W. Va., *387; Comments on, 385
Three-wire distribution in Wilmington [Way], *307; Comments on, 306
—Bridge to Camden, 994
—Frankford Elevated Railway:
Cars for, *1063
Operation by P. R. T. proposed, 250, 840, 1121
—Philadelphia Rapid Transit Co.:
Annual report, 182
Burning pulverized anthracite coal [Rau], *945
Frankford elevated lease question, 250, 840, 1121
Freight service to be discontinued, 845
Jan.-Aug. report, 663
Jan.-Oct. report, 968
Park planned, Burd Home, 292
Picnic commemorated, *955
Rental question reviewed, 71
Status of Mr. Mitten asked, 530
Wage reduction suggested, 412; In effect, 562
Philadelphia & West Chester Traction Co. (see Upper Darby, Pa.)
Philadelphia & Western Ry. (see Norristown, Pa.)
Philippine Islands:
—Manila Electric Company:
Equipment of, *357
Pine Bluff, Arkansas:
—Arkansas Light & Power Co.:
Transmission line, 33,000 volt, 14

Pittsburgh, Pennsylvania:
—Pittsburgh Railways:
Car riding decreases, 754
Foreclosure of West End lines granted, 148, 221; Opposed, 298
Reorganization, Plan proposed, 180, 418, 798, 967, 1086, 1126; Comments on, 1137
Wage decrease, 69, 145
—Traffic, Automobile [McGunnegle & Montgomery], 21
—West Penn Railways:
Freight business with Pittsburgh Rys., 420
Kingwood company purchased, 1006
Wages decreased, 413
Pittsfield, Massachusetts:
—Berkshire Street Railway:
Annual report, 297
Wages decreased, 752
Plattsburgh, New York:
—Plattsburgh Traction Co.:
Annual report, 29
Poles:
—Digging holes and setting by machines, *159
Politics:
—Traction situation indicated by, 877, 920, 964, 1126, Comments on, 849
Pomeroy, Ohio:
—Ohio River Electric Railway & Power Company:
Franchise sustained by vote, 964
Port Chester, New York:
—New York & Stamford Railway:
Annual report, 297
Portland, Oregon:
—Oregon Electric Railway:
Round trip fares decreased, 260
—Portland Railway, Light & Power Co.:
Door guides welded to plates, *954
Fare change, Effect of, 185
Financial changes, 663
Laborers wages decreased, 564
Machines for reclaiming controller segments, *909
Maintenance investigation, 108, 252, 414
Safety first results, 971
Steps, Folding, *1078
Truck for oxyacetylene equipment, *1148
—Southern Pacific Co.:
Rate advance suspended, 73
Posters (see Publicity, Car cards and posters)
Potomac Electric Company (see Washington D. C.)
Pottsville, Pennsylvania:
—City starts removing tracks, 255
—Eastern Pennsylvania Railways:
Stockholders organize, 842
Poughkeepsie, New York:
—Bus terminal improvements planned, 1053
Power distribution:
—Augur boring and pole setting truck, *903
—Cables:
Corrosion in St. Louis, 442
—Coal by rail versus electrical transmission, 804
—Committee report on [A. E. R. E. A. Com.], 631, Discussion of 632
—Feeders, Automatic protection [Butcher], 57; [Bale], 58; [Jones], 60
—Maintenance improved by graphic records, *1139
—Maintaining overhead line [Gates], 655
—Miniature system layout, *435
—Substations in Cincinnati, *1099
—Three-wire distribution for electrolysis mitigation [Way], *307; Comments on, 306
—Transmission line, 33,000 volt, 14
—Transmission line in Illinois, *1070
Power generation:
—Costs in New York, 1115, 1156
—Economies suggested, Comments on, 267
—Hydro-electric development permits, 824
—Oil supplanting coal in Great Britain, 25, 214
—Production in U. S., *205
—Steam production [A. E. R. E. A. Com.], 628; Discussion, 629
—Steam, knowledge of limited, 1072
—Superpower zone proposed:
Report, *819, Comments on, 808
Power stations and equipment:
—Boiler performance for pulverized anthracite, [Rau], *945
—Circular crane for storage bunker, *357
—Dam reconstruction, 566
—Energy purchased or generated, *1099
—Fan drive by polyphase commutating motor, 733
—Hydro-electric plants in Switzerland, 1014
—Powdered fuel, Use of [Savage], 172, 629
—Pumphouse for condensing water, *387; Comments on, 385
—Turbo generators on test, 303
—Turbo-generator record, 829
—Vacuum trap, *906
—Wilmington, Delaware, plant, *232; Comments on, 267
Private ownership of utilities recommended by N. A. R. & U. C., 871
Prosperity due to co-operation [Atkinson], 990
Providence, Rhode Island:
—Rhode Island Company:
Freight operations, *41
Receivers discharged, 418, 454
Rental payment ordered, 70
—United Electric Railway:
Financial difficulties, 713
—United Traction & Electric Co.:
Foreclosure sale, 31
Publicity:
—Advertising, Comments on psychology of, 849
—Advertising principles [Boyce], *167
—A. E. R. A. Commmittee report, 614
—Bank aid in Louisville, 136
—Car cards and posters:
Chicago Surface Lines posters, *62, *553
Chrismas greetings on C., N. S. & M., *1116
London Underground's, *137, *506
"Traction Topics" of Chicago Surface Lines, *1117

Publicity (Continued):
—"Commendations" of Third Ave. Ry., 138
—Cost of private automobile, Comments on, 850
—Discussion of [A. E. R. A.], 642
—Employees to submit advertisements, 957
—Exhibits at Chicago pageant, *360
—Expense justifiable, Comments on, 1016
—Extremes must be avoided, 136
—Good will main object, Comments on, 386
—Growth in Peoria, *33
—Industrial publishing course, 659
—Information to Memphis public, 919
—Introducing weekly pass, 665
—Joint railway advertising advocated [Schade], *513
—Letter writing contest, *374
—Mother Hubbard, New, *137
—Motion pictures as a means:
  Utilized by I. T. S. ["Observer"], *505
  Utilized by N. E. L. A., Comments on, 345
—Safety car advertised, *955
—Schedule changes, Comments on, 542
—Soliciting and advertising for freight and passenger traffic ["Observer"], *505
—Stock sale in Milwaukee, *110
—Stores aid [Boyce], *353
—Track, an advertisement, [Dunham], *484
—Weekly pass in Youngstown, Ohio, *899
Public Relations with:
—Citizens' help [Casey], 18
—"Civility" campaign in Akron, Ohio, 755
—Co-operation essential [Arkwright], 137
—Courtesies to increase good will, 802
—Dividends of service, *138
—Employees instructions, *926
—Factors in improving [K. A. P. U.], 997
—"Ifs" for good will [Boyce], 355
—Literature for public, Effect in Salt Lake City, 350
—Newspaper attitude, 1064, 1116
—"No smoking allowed" dialogue, 878
—Prosperity due to co-operative attitude, 990
—"Pull together" campaign, Camden, N. J., 260
—Sales department to improve [Goodwin], *466
—Service, An example of [Lemmon], 442; Comments on, 425
—Service improves, Kansas City, Mo. [Buffe], *475
—Service, The soul of [Rodgers], 875
—Street calling in Minneapolis, 919
—Trainmen's names, Placards with, 802
—Utility information bureaus:
  Georgia forms, 65
  Illinois:
    Chicago progress, 293
    History and work, 1064
    Franchise contracts, 332
  Ohio, Talks to civic bodies, 920
—Value of public favor, 420
—Winning support and confidence, [Myers], 210
Public service and regulative commissions:
—Attitude towards railways [Ainey], 18
—Bus situation discussed [N. A. R. U. C.], 789
—Comparison to trustees in Mass. [Dana], 587
—Constructive leadership in Connecticut, Comments on, 230
—Interstate Commerce Commission:
  Accounting questions and answers 30, 174
  Interstate and intrastate rates, Ruling on, 378
—Jitney regulation in Connecticut, 50, 74, 113; Comments on, 40, 158
—New Jersey law questioned, 224
—Pennsylvania, History and Work, *163
—Reason in regulation [Perry], 787
—Regulation discussed [N. A. R. & U. C.], 708
—Regulation, Fundamentals of [Carr], 211
—Rental inquiry opposed by Penn. court, 71
—State regulation contrasted with service-at-cost [Way], 589
—Wisconsin, History and work of, *765
Public Service Ry. (see Camden, N. J., and Newark, N. J.
Public Utilities Association of West Virginia:
—Annual convention, 786
Publishing:
—Industrial course in, 659
Purchases:
—Material specifications, Comments on, 724
—Principles to be followed [Pellissier], 784
—Standards for purchasing [Doyle], 604

R

Racine, Wis.:
—Weekly pass [Jackson], *203; Comments on, 191, 1015
Rail joints and bonds:
—Bond testing cars [McKelway], *82
—Expansion joints in Hamburg [Mattersdorff], *979
—Interconnection of track crossings:
  Detroit, 391
—Special track work bonding, *121
—Splice bar for girder rail, *733
—Welded joints in Baltimore [Wysor], *170
—Welding joints [Price], 636
—Welded joints on D. M. R., *121
Rails:
—Australian standard, *825
—Drop and impression tests [Speller and Farkell], 636
—Slipping wheels, Effect of, 362
—Titanium-treated, Service tests, 248
Railways:
—Place in railroad emergency, Comments on, 724
—Relation to community [Casey], 18
—Relation to industrial efficiency [Hoover], *580
—Status of industry [Todd, by Bozell], 1018
—Value of in future [Lambert], 554
Raleigh, N. C.:
—Carolina Power & Light Co.:
  Fare increase sought, 34, 802, 1010
Receiverships (see Financial)
Rectifiers (see Substations and equipment)
Regulation, Fundamentals of [Carr], 211
Rehabilitated lines:
—Abilene Street Railway to be operated, 298
—Nassau Elec. R.R., 31
Repair shop practice:
—Advantages of railway men's meetings, Comments on, 2
—Compressor piston clearances [Foote], 445
—Economy in [See], *684
—Machines, Comments on need for, 426
—Painting:
  Economical limits, Comments on, 673
  Economies in Vancouver [Murrin], *11
  Economy in [See], *684
  Spraying, *782
—Minimum handling of equipment, Comments on, 890
—Reclaiming, Comments on excessive, 426
—Repair records, Armature, *783
—Washing in circulating water prevented, *688
Repair shops and equipment (see also Stores):
—Air compressors, Belt-driven, *694
—Air drill, Portable, *780
—Aluminum, Machining of, 448
—Arrangement for economies [Dean], *279
—Beautifying waste ground, Comments on, 542
—Controller segments, Reclaiming, *909
—Crane, crawling tractor type, 446
—Crane limit switch, *908
—Features in Salt Lake City, *347
—Field coil impregnating, *1078
—Field coil repairs [Hester], *14
—Glue stains, Removal of, 243
—Hamburg shop layout [Mattersdorff], *979
—Horizontal boring, drilling and milling machine, *694
—Hose dismantling and assembling machine, *326, *367
—Interstate Public Service Co. shops, *3
—Loading platform for refuse, *5
—Montreal, Que., Features of, *193; Comments on, 192
—Motor starters, Safety and protective, 907
—Newark shops of Rochester & Syracuse R.R., *99
—Nutlock, Fin type, *248
—Oven for armature coils, Portable [Norene], *142
—Pit jack, *168
—Pneumatic scoop, *446
—Quenching cracks, Causes of, 908
—Reducing costs [See], *684
—Reclamation shop and work, *98
—Remodeling in New York City [Westlake], *897
—Shaving exhaust system, *869
—Spring, Hardening outfit, *102, 290
—Tapping machine, Automatic, *906
—Tension machine for armature banding, *692
—Test box, Convenient form of *291
—Trolley transveyor system, *207
—Truck for oxyacetylene equipment, *1148
—Typical shops [A. E. R. E. A. Com.], *637
—Winnipeg shops rebuilt, *437
—Wood-working shop arrangement, *1075
Rhode Island Company (see Providence, R. I.)
Richmond, Va.:
—Virginia Railway & Power Co.:
  Dam reconstruction, 566
  Jitney situation, 1005
  Safety cars permitted, 883
  Trackless trolley proposal, 1005, 1042
  Trackless trolley statistics, 1024
  Wage conference proposed, 563; Conditions unchanged, 752
Rochester, N. Y.:
—Automobile accidents [Quigley], 606
—New York State Railways:
  Annual report, *1128
  Spring hardening outfit, *102, 290
  Supply truck, *240
  Trackless trolley proposed, 838
Rochester & Syracuse R.R. (see Syracuse, N. Y.)
Rockford, Ill.:
—Jitney situation, 333, 884
—Rockford & Interurban Railway:
  Bus operation, 884

S

St. Augustine, Florida:
—City-railway propositions, 927
St. Catherines, Ontario, Can.
—Niagara, St. Catherines & Toronto Railway:
  Municipal purchase recommended, 1129
St. John, New Brunswick, Can.:
—New Brunswick Power Co.:
  Wage strike, 217
St. Joseph, Missouri:
—St. Joseph Railway, Light, Heat & Power Company:
  Valuation case not carried up, 533
St. Louis, Missouri:
—Rapid transit system proposed, 750
—Trackless trolley proposed, 529
—United Railways:
  Accident costs, 333
  Bond issue underwritten, 181
  Cable corrosion, 442
  Jefferson City fare extended, 925
  Statement of conditions, 956, 966
  Suits against receivers, 297
  Valuation testimony, 797, 966
  Wage reduction announced, 566
St. Paul, Minnesota:
—St. Paul City Railway:
  Fare controversy, 33, 259, 457, 802, 882, 926, 1161
  Valuation sought, 29, 33
Sacramento, California:
—Pacific Gas & Electric Co.:
  Fare question, City's choice, 1090
—Sacramento Northern Railroad:
  Annual report, 416
  Sale to Western Pacific sought, 454; Authorized, 797
Safety cars (see Cars, Safety)
Safety first (see also Accidents):
—Accident prevention work of Penn. Com., *163
—Accident reduction campaign, *131
—Automobile circular of hints, *987
—Boston's "No accident" week, 420
—Buffalo campaign, 755
—Campaign suggestions of A. E. R. A., 66
—Chicago Council, Work of, 331; [Budd], 605
—Constructive method of educating [Roadifer], 745
—Contest of Southern Public Utilities Co., 1161
—Continuous safety drive [Budd], 605
—Co-operative employees, 997
—Extent of work [A. E. R. T. & T. Com.], 648, Discussion, 648
—Floats aid Baltimore campaign, 300
—Gates, Positive stop crossing, *1145
—Grade crossings, Hazard off and protecting signs for [Messenger], 744
—Life guard, Spring operated, *209
—Maps of danger points, 184
—Precautions on overhead lines [Gates], 655
—Record on C. N. S. & M., 238, 718
—Results in Portland, Oregon, 971
—School campaign in San Francisco, Cal., 925
—Teaching by fairy tales, 757
Saginaw, Michigan:
—Bus offer, 373, 709, 755; 790, 1044
—Jitney situation, 296, 323, 373, 453, 530, 659, 667, 1004
—Saginaw-Bay City Railway:
  Service resumption desired, 876, 918, 1004; Voted against, 1044
  Suspension and receivership, 296, *323, 373, 453, 530, 659, 709
Salt Lake City, Utah:
—Bamberger Electric Railroad:
  Compensation payment ordered, 839
—Interurban terminal planned, 374
—Salt Lake & Utah Railroad:
  Fare increase granted, 185
  Rate discrimination charged, 115, 300
—Utah Light & Traction Co.:
  History and features, *347
  Rehabilitation program, 217
San Antonio, Texas:
—San Antonio Public Service Company:
  Fare reduction proposed, 1010, 1054
  Flood damage, 530
San Diego, California:
—San Diego Electric Railway:
  Bonds authorized, 923
  Jan.-Aug. report, 920
  Jan.-Mar. report, 257
Sanding devices (see Fixtures)
Sandusky, Norwalk & Mansfield Electric Railway (see Norwalk, Ohio)
San Francisco, California:
—Cable car runs away, *1157
—Market Street Railway:
  City purchase proposed, 218, 532, 1007, 1047
  Cutting device for asphalt pavement, *291
  Labor turnover statistics, *993
  Power plow and derrick, *208
  Substation [Woodbridge], *269
  Terminal traffic, *49, 545
  Valuation of, 1153
  Wages decreased, 414
—Northwestern Pacific Railroad:
  Third rail system, Construction of, 743
—Ocean Shore Railroad:
  Abandons two lines, 219
—Rerouting relieves congestion, *49
—Safety first educational campaign, 925
—San Francisco Municipal Railway:
  Annual report, 147, 417
  City must pay cost of moving conduit, 876
  Extensions proposed, 662; Cost data, 751
  Market Street traffic, *49
  Presidio terminus, *950
—Southern Pacific Company:
  Interurban electrification urged, 658
—Subway proposed, 1084
San Francisco-Oakland Terminal Railway (see Oakland, Cal.)
San Jose, California:
—San Jose Railroads:
  Fare increase denied, 1049
Saugus, Massachusetts:
—Bus company enlarges operation, 340
Savannah, Georgia:
—Savannah Electric & Power Company:
  Bond offer, 713
—Savannah Electric Company:
  Reorganization plan, 182, 336, 713
Schedules and time tables:
—Car and bus speeds in Chicago, Ill., 1035
—Connecting lines listed, *394
—Economics of [A. E. R. A. A. Com.], 649; Discussion, 650
—Illuminated time table, 205
—Keeping cars on time [Whitney], 1038; [Bolt], 1039; Discussion, 1081
—Loop to avoid congestion, *725
—Routes and schedules in Salt Lake City, *347
—Speed and frequency affect transportation sale [Morgan], *499
—Speed, increased in Kansas City, Mo. [Buffe], *475
—Staggered hours proposed for New York City, *1138
Schenectady, New York:
—Schenectady Railway:
  One man car question, 845
  Wage arbitration, 414, 562, 658
Scranton, Pennsylvania:
—Scranton, Montrose & Binghamton Railway:
  Service resumption, 145
Seattle, Washington:
—Bus terminal, 340
—Jitney situation, 224, 260, 373, 412, 457, 571, 664, 666, 716, 926, 971, 1010, 1011, 1093, 1131
—Non-competitive buses favored, 885, 1011, 1133
—Seattle Municipal Railway:
  August report, 664

Abbreviations: *Illustrated. c Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Seattle, Washington:
—Seattle Municipal Railway (Continued):
  Bus purchase bill vetoed, 801
  Fare decrease proposed, 750, 758, 881, 1161
  Financial difficulties 29, 181; Comments on, 81, 713; 750, 881
  General funds not available for operation, 840, 1121
  Greasing and cleaning tracks, *140
  Improvements proposed, 71, 750, [Witt] 1041, 1125; Comments on, 1137
  July report, 376
  May report, 70
  Purchase contract controversy, 108, 715, 1005
  Three-cent fare, Advocated, 114, 457; Comments on, 81; Opposed, 716
  Transportation investigation, 750, 795, 1041
  Wage reduction proposed, 334; Adjusted, 374
—Seattle & Rainier Valley Railroad:
  Wage agreement, 1084
—Trackless trolleys proposed, 374, 1024
Service and tower wagons:
—Autos useful [Dana], c52; Comments on, 39
—Electric truck for line repairs, *277; [McKelway], *944
—Emergency truck in Atlanta, Ga., *734
—Hose bridges carried in trailer [Hughes], *241
—Supply truck, *240
—Tower truck for Detroit, *680
—Truck attachments for boring and pole hoisting, *903
—Winch truck, *910
Service as basis of rates [Tingley], 998
Service at cost:
—Bonds easily sold in Montreal, 1046
—Contrasted with state regulation [Way], 589
—Des Moines, Iowa, franchise features, 749, 1033
—Incentives proposed [Newman], 582
—Modifications in Cincinnati suggested, 67
—Norfolk's proposed franchise, 215
—Proposed for:
  Des Moines, Iowa, 709
  Fresno, California, 215
  Houston, Texas, 145, 333, 563; Defeated, 662; New franchise, 838; Defeated, 969; New proposal, 1044, 1083
  Milwaukee, Wis., 146, 253
  Norfolk Virginia, 215
  Vancouver, B. C., Can., 217
—Rejected in Vancouver, B. C., 374
—Review of [Gruhl], 595
—Successful in Cleveland [Sanders], 1154
—Trusteeship in Massachusetts [Dana], 587
Service index, Comments on, 346, 426
Shore Line Electric Railway (see Norwich, Conn.)
Shore Line Traction Co. (see New Haven, Conn.)
Shreveport, Louisiana:
—Shreveport Traction Co.:
  Fare controversy, 113
  One man cars permitted, 844
Signals:
—Automatic stop with, 432
—Daylight color light, Liverpool, 1150
—Interlocking control, 48
—Maintenance improved by graphic records, *1139
—Power operated, 368
—Train movements accelerated, 399
Signs combined with strain insulators, 142
Single-phase railways in long service [Jones], *907
Sioux City, Iowa:
—Jitneys ruled out, 222
Skip-stop (see stopping of cars)
Snow removal:
—Equipment for, in Milwaukee *857
—Problem discussed [A S M. C. Com.], 699
—Rotary ice digger, *1077
—Tractors effective, *857
Soil corrosion (see Corrosion)
Somerset Kentucky:
—Kentucky Utilities Company:
  Operation resumed, 455
Somerset, Pennsylvania:
—Johnstown & Somerset Railway:
  Bond issue, 454
South Africa:
—Johannesburg:
  Electric truck as tower wagon, *277
South America:
—Electrification progress, 351
South Bend Indiana:
—Chicago South Bend & Northern Indiana Railway:
  Bus competition with, 801
—Jitney situation 1053
South Carolina Light Power & Railways Co. (see Spartansburg S. C.)
Southern Covington & Cincinnati Street Railway. (see Covington, Ky.)
Southern Pacific Co. (see Portland, Ore., & San Francisco, Cal.)
Southern Public Utilities Co (see Charlotte, N. C.)
Spade, Air driven, *446
Spain:
—Cataluna Tramways of Barcelona:
  Motor cars for, *6
—Electrification contract, 1055
—Railway planned, 1096
Spartanburg South Carolina:
—South Carolina Light, Power & Railways Co.:
  Interest defaulted, 220, 455
Special trackwork:
—Bolted type [Rust], 525
—Built up type in Salt Lake City, 347
—Changes for right hand operation [Murrin], 894
—Construction and bonding on D. M R., *121
—Engineering data [A. E. R. C. A. Com.], *634
—Frog repairs, *15
Special trackwork (Continued):
—Frogs with acute angles by welding, *910
—Loops necessary for trail cars [Palmer], 891
—Loop, Universal type in Kansas City, Mo., *725
—Prices of, since 1900, *691
—Repairing by shims and welding [Smith], 527
Spokane, Washington:
—City-railway controversy, 32, 75, 300
—Spokane & Eastern Railway & Power Co.:
  Fare increase granted, 32, 75
—Washington Water Power Co.:
  Abandonment of certain lines sought, 298
  Abandons Lidgerwood line, 569
  Fare increase, 32, 75
  One man cars decrease accidents [Ashton], 875
Springfield, Illinois:
—Springfield Consolidated Railway:
  Placards with trainmen's names, 802
Springfield, Massachusetts:
—Springfield Street Railway:
  Energy saving [Wood], *681
  Freight operation, *41
  Train jumps track, 414
Springfield, Missouri:
—Jitney situation, 570
—Springfield Traction Company:
  Jitney rights acquired, 570
Springfield, Ohio:
—Fort Wayne, Van Wert & Lima Traction Company:
  Time table arrangement, *394
—Ohio Electric Railway:
  Disintegrates, 182, 295
  Foreclosure desired, 71
  Jan.-July report, 664
  Jig for rebabbitting connecting rods, *274
  Newspaper sympathetic, 1116
  Portable substation with collapsible construction [Foote], *169
—Springfield Railway:
  Financial difficulties, 754
—Springfield Terminal Railway & Power Co.:
  Claims against, Status of fixed, 533
  Reorganization, 1045
Springs (see Fixtures)
Standardization:
—C. E. R. A. Committee report, 53
—Paving bricks, *994; Comments on, 978
—Pipe flanges and fittings, Committee on, 958
—Railway electrification in Great Britain, 826
—Screwed fittings, 1120
—Secretaries of national bodies confer, 66
—Standards proposed, 732
—Value of, Comments on, 541
—Work of A. E. R. E. A. [Gove], 624; Comments on, 671
Staten Island Midland Railway (see New York City)
Statistics:
—Automobile accidents in Rochester, N. Y. [Quigley], 606
—Accidents, Cost of, 1148
—Accidents in Chicago [Kelker], *244
—Claim department important [Handlon], 656
—Coal consumption, 201
—Coal costs in New York City, 1115
—Default of traction bonds, 922
—Earnings of railways [C. & F. Chron.], 70, 147
—Freight operation in Mass., 41
—German railway conditions, *358
—Labor turnover on a railway, *731, *993
—New York railways, *944, *1065
—Operation:
  Boston Elevated Railway, 148
  Hamburg Elevated Railway [Mattersdorff], *979
  Havana, Cuba, 336
  London's railways, 111
  Motor buses in California, 319
  Revenue of 72 railways, *1047
  Rochester, New York, 1128
  Safety cars in Oakland, 314
  Salt Lake City, 347
  San Diego Electric Ry., 257
  Trackless trolleys, 1024; [Jackson], 859, 1027
  Zurich, Switzerland, *417
—Power generated in U. S., *205
—Railways in India and Ceylon, 1013
—Railways operating motor buses, 319
—Safety cars decrease accidents [A. E. R. A. Com.], 619
—Service in 20 cities [Dahl], 239
—Track construction in United States, 730
—Traffic due to weekly passes, *1104
—Traffic in New York, *941, 1151
—Traffic on 154 railways, 220
—Truck operation for freight, 133
—Wage decreases, 995
—Wire production proposed, 575
—Steps (see Fixtures)
Stockton, California:
—Tidewater Southern Railway:
  Locomotive features, *326
Stone & Webster:
—Seventeen year report
Stopping of cars:
—Automatic and interlocks, 48
—Indicators with advertising space [Eichel], *814
—Poles painted as warning for, *693
—Trip-cock testing in London, *829
—Skip-stop:
  Signs used in Chicago, 683
  Pasting signs on poles [Mc Kelway], 1076
Stores:
—Accounting [A E. R. A. A. & A. E. R. E. A. Com ], 631; Discussion, 697
—Scrap classification, 383
Storm damage:
—Flood, San Antonio, Texas, 530
—Tampa, Florida, 839
Strikes and arbitrations:
—Coal strike in Great Britain, 25, 241
Strikes and arbitrations (Continued):
—Cost of strike in Albany, 1005
—French railway strike, 1035
—One man car protest, F. J. & G. R. R., 145
—Picketing lawful, 1084
—Strike condemned, Report on Denver strike, 793
—Strike prevention proposed, Comments on, 1057
—Strikers status, 868
—Wage arbitrations:
  Akron, Ohio, 51, 68, 179, 216
  Cincinnati powerhouse men, 145
  Connecticut Company, 661, 751, 794
  Des Moines, Iowa, 108
  Living costs in Akron, O., 51
  Newtonville, Mass., 414
  Schenectady, New York, 414, 562, 658
—Wage strikes:
  Albany, N. Y., 531, 563, 868, 961, 1005
  Dayton, Ohio, 178
  St. John, N. B., Can., 217
  Scranton, Montrose & Binghamton Ry., 145
  Syracuse & Suburban R.R., 252, 294
Substations and equipment:
—Automatic:
  Cincinnati installs, *1099
  City service [Butcher], 58; [Bale], 58
  Cleveland system [Bale], 58
  Discussed by C. E. R. A., 53; [Butcher], *56; [Bale], 58; [Jones], 60
  Features of [A. E. R. E. A. Com.], 628; Discussion, 630
  Feeders in cities [Butcher], 57; [Bale], 59
  Fort Wayne 1200-volt station [Butcher], 57
  Motor generator control [Butcher], 56
  Single phase replaced by, *543
  Single unit stations in Cincinnati, *1099
  Two unit stations [Butcher], *56; [Bale], 59; [Jones] 60
—Features in San Francisco [Woodbridge], *269
—Grounds, Comments on beautifying, 542
—Motor generator moved for emergency, 1112
—Motor-generators constructed from engine-driven machines [Smith], *91
—Lightning destroys, *450
—Portable with collapsible construction [Foote], *169
—Rectifiers for [Milliken], *779
—Rectifiers in France, 669
—Standardize on 1500 kw. units, *1099
Subways:
—Abandonment in Cincinnati recommended, 794
—Elevated roads compared with [Ridgway], 833
—Freight handling in New York proposal, 710
—London proposal to aid unemployment, 996
—Proposed for Montreal, 711
—Proposed for St. Louis, Mo., 750
Superpower zone, Report on (see Power generation)
Switchboards and equipment:
—Circuit breaker, Oil, 246
—Circuit breakers, Removable unit type, 207
—Substation, Details [Woodbridge], *269
Switzerland:
—Electrification status, [Huber], *988
—Hydro-electric development, 1014
—Locomotives for Swiss Federal Railways, 825
—Steam heating electric trains [Rosenberger], *206, *829
—Zurich abandons zones, *417
—Zurich, Annual report, *417, 1007
Syracuse, New York:
—Empire State Railways:
  Wage controversy, 146, 179
—New York State Railways:
  City-railway controversy, 925, 927, 1011
  Five cent fare sought, 115, 666
  May-August report, 568
  Utica fare increase denied, 534; Comments on, 464
—Rochester & Syracuse R.R.
  Shop notes, Newark, N. Y., *99
  Wage controversy, 146, 179, 215
—Syracuse & Suburban Railroad:
  Strike, Wage situation, 252, 294

T

Tacoma, Washington:
—Jitney situation, 159, 801
—Tacoma Railway & Light Co.:
  Extension controversy, 251
Tampa, Florida:
—Tampa Electric Company:
  One man cars maintain five-cent fare, 338
  Storm damage, 839
Taxes:
—California bill challenged, 70, 180
—Federal income tax unjust in Cleveland [Sanders], 1154
—Franchise, Elimination of, sought in Cincinnati, Ohio 969; Allowed for 1922, 1156
—Illinois motor vehicle license, 184
—National, Revision of, 1007; [Haig], 1068
—Paving costs assumed by property owners, 375
—Paving relief in Jackson urged, 658
—Proposed changes, Comments on 191
—Railroads provide bus roads, 1092
—Reduction urged in Kansas City, Mo., 70
—Segregation of utilities urged [Gadsden], 212; Remarks on, 250; Comments on, 191, 851
—Tax-exempt securities (see Financial)
Telephoning by "carrier currents" on power wire, *1032
Terminals:
—Bus, Poughkeepsie, N. Y., 1053
—Commuters do not require [Turner], 1151
—Freight in Massachusetts, *41
—Interurbans in Salt Lake City, 374
—Los Angeles situation, 26

Terminals (Continued):
—Pageant facilities in Chicago, *89
—Railways as freight distributors [Bibbins], 591
—San Francisco, Cal., Presidio terminus, *950
—Traffic routing in San Francisco, *49, *545
—Tunnel crossing, *870
—Two levels at Cincinnati, Ohio, *865
Terre Haute, Indianapolis & Eastern Traction Co. (see Indianapolis, Ind.)
Test box, Convenient, *291
Tests of material and equipment:
—Circuit breakers, Calibration, *139
—Insulation testing [Dean], 85; Comments on 79
—Miniature distribution layout, *435
—Motors during construction [Dean], *427
—Plows, Overload testing, *139
—Steel rails, Drop and impression tests [Speller and Farkell], 636
—Voltage tests at 1,000,000 volts, 781
Texas Electric Railway (see Dallas, Texas)
Third Avenue Railway (see New York City)
Tickets and tokens:
—Berlin's eight-ride ticket, *143
—Coin and ticket sorter, *1073
—Coin counter, *209
Tidewater Southern Ry. (see Stockton, Cal.)
Ties:
—Creosoted and set in concrete, Success, *97
—Creosote plant in Chattanooga, *101
—Growth and milling of [George], *1059
—Pre-treatment of, *782
—Standard specifications, Conference, 708, 873
—Substitute, Necessary properties of [Ferneding], 635
—Supply of, Comments on, 1058
Tokens (see tickets and tokens)
Toledo, Ohio:
—Community Traction Co.:
  August report, 664
  Fares increased, 301, 536
  Fare increase postponed, 666
  July report, 335
  June report, 112
  November report, 1008, 1159
  October report, 880, 968
  Power cost controversy, 178, 333
  Prospects, 413, 1159
  September report, 753
—Jitney situation, 150, 381, 659, 1005, 1052
—Toledo Bus Transportation Company:
  Incorporates, 885, 1052
—Toledo Railway & Light Company:
  Reorganization, 418, 533, 567, 664
—Toledo & Western Railroad:
  Cars, Light weight desired, 1005
  Abandonment of part of line desired, 569
—Topeka Railway:
  Wages decreased, 453
Toronto, Ontario, Can.:
—Rail gage, Non standard retained, 84
—Toronto Civic Railway:
  Fare rate, 378
—Toronto Railway:
  Annual report, 923
  City purchase, 337, 411, 460, 532, 567, 713, 1006
  Fare increase, 666
  Sale of old rolling stock, 761
  Valuation arbitrators, 152; Hearings, 532, 567, 713, 1006, 1045
  Bus routes established, *867, 1053
Track abandoned (see Abandoned lines)
Track construction:
—Accounting methods [Davis], 703; Discussion [A. E. R. A. A.], 698
—Cement mixtures, Accelerating setting of, 869
—Changes in Chicago for pageant, *89
—Drainage on D. M. R., *121
—Dynamite, Non-freezing, 1076
—Features of D. M. R., *121; Comments on, 120
—Labor costs [Wilson], *438
—Labor savers in Detroit, *121
—Mechanical ties in Gary, Ind., *321
—Practice in United States, 730
—Raising track [Cram], *895
—Recommendations on [A. E. R. E. A. Com.], *634; Discussion 635
—Odd gage retained in Toronto, 84
—Power plow and derrick, *208
—Rebuilding track on old ties, *97
—Specifications proposed [A. S. M. I.], 830; Comments on, 807
—Tie plate, Universal, *98
Trackless trolleys:
—Adaptability of in York, England, 772
—Automatic foot control, *863
—Brill development, *551, *863
—British installations [Jackson], *859, *1027
—Cars (see Cars, Trackless type)
—Comparative cost with motor bus and safety cars [Simmon], *394; [Stocks], *517; [Thirlwall], *546; [Andrews], 769; [Stocks], 771
—Cost data from Bradford and Leeds [Jackson], *859; Comments on, 851
—Cost data from New York trial, Comments on, 850
—Cost data from Tees-side and York [Jackson], 1027
—Detroit, Mich., Specifications, 320; Trial, *359, *522
—Evolution of, not revolution [Wheelwright], 710
—Front-drive in Leeds, England, 1036
—Hamburg's experience [Schiemann], 1023
—Increasing traffic by, Comments on, *514
—Italian military lines, 1026
—Operating statistics, 1024
—Opposed in Buffalo, 259, 719
—Packard type tried in Detroit, *359
—Proposed for:
  Akron, Ohio, 185
  Rochester, N. Y., 838
  St. Louis, Missouri, 529
  Seattle, Wash., 374, 1024
Trackless trolleys (Continued):
—Richmond, Virginia, situation, 1005, 1042
—Staten Island, N. Y., extension proposed, 752
—Staten Island installation, *689; Comments on, 850
—"Trollicar" of St. Louis Car Co., *1025
—Vienna's installation [Jackson], 1027
Track maintenance:
—Concrete breaker, *327
—Construction kinks [Smith], 527
—Crane, Crawling tractor type, 446
—Factor in sale of transportation [Dunham], *484
—Greasing and cleaning tracks, *140
—Pneumatic scoop, *446
—Prolonging life of car parts, Comments on, 305
—Retracking or buses [Jackson], *315
—Weed cutter in Texas, *448
—Weed killers, Use of, 524
Traffic investigations:
—Aid to transportation sales [Morgan], *499
—Guide advertising by, Comments on, 465
—Headwaygraphs for [Roberts], *440
—Nashville, Tennessee, 566
—New York City, 824, *941
—Report on 154 railways, 220
—Rerouting proposed for Chicago, Ill., *938
—Rerouting proposed for New York City [Turner], *1109; Comments, 1097
—Topographical limitation in Pittsburgh [McGunnegle & Montgomery], 21
—Traffic density units, Comments on, 346, 426
—Weekly pass, Effect of, *1104
Traffic regulation:
—Bridge replacefent arrangements, *1113
—Double traffic for convention, *951
—Inspectors aid, *49
—Organization and methods in New York [O'Brian], 603
—Principles [A. E. R. A. T. Com.], 647
—Safety zone, Purpose of [Rudd], c52
—Service improvement, Kansas City, Mo. [Buffe], *475
—Staggered hours proposed for New York City, Comments on, 1138
—Suggestions by A. S. M. I. Com., 830
—Terminal traffic in San Francisco, *47, *545
—Vehicular congestion, Suggestions for aiding [Barnes], 998
Traffic stimulation:
—Elements affecting riding [Dahl], 239
—Using tracks, 100%, 554
—Weekly pass in Youngstown, Ohio, *1104
Transfers (see Fare collection)
Transportation, Metropolitan:
—Berlin situation [Eichel], *814
—Buses versus trolley [Pearson], 866
—Commuters in New York City [Turner], 1151
—Fares, Factors affecting [Ashfield], 312
—Effect of garden sites, Comments on, 465
—Manufacturer interested in railways [Wickwire], 599
—Monopoly and jitneys, Comments on, 305
—Monopoly essential [Todd, by Bozell], 1018; [Bradlee], 1036
—New York City situation [Harkness], 403; Comments on, 385
—Population and rides per inhabitant [Ertel], *199
—Rapid transit systems [Ridgway], 833
—Relation between traffic and housing [Ertel]) *199
—Traffic in New York, *941
Transportation superintendent:
—Value of "good talker," Comments on, 425
Trenton, New Jersey:
—New Jersey & Pennsylvania Traction Co.:
  Consolidation disapproved, 568
  Fare increase sought, 667, 718
  Reports deficit since 1913, 112
  Wages decreased, 145
Tri-City Railway (see Davenport, Iowa)
Trinidad, Colorado:
—Trinidad Electric Transmission, Railway & Gas Company:
  Abandonment of part of lines proposed, 1008
Troy, New York:
—Troy & New England Railway:
  Annual report, 29
—United Traction Company (see Albany, N. Y.)
Trucks:
—Archbar, light weight, *933
—Bolster repaired by welding, *1074
—Pressed steel welded, *12
—Rebuilding, *193
Tulsa, Oklahoma:
—Jitney situation, 457
—Tulsa Street Railway:
  Supplementary bus service planned, 218
Twin City Rapid Transit Company (see Minneapolis, Minn.)
Tygarts Valley Traction Company (see Grafton, W. Va.)

## U

Underwriters laboratories and their work [Muldaur], 594
Unemployment (see Employees and Labor)
Union Traction Co. of Indiana (see Anderson, Ind.)
United Electric Railway (see Providence, R. I.)
United Light & Railways Co. (see Grand Rapids, Mich.)
United Railways Investment Company (see Jersey City, N. J.)
United Railways (see St. Louis, Mo.)
United States Chamber of Commerce:
—Transportation committee, 178
United Traction Co. (see Albany, N. Y.)
United Traction & Electric Co. (see Providence, R. I.)
Upper Darby, Pennsylvania:
—Philadelphia & West Chester Traction Co.:
  Center entrance cars for, *6
Utah Light & Traction Co. (see Salt Lake City, Utah)
Utah, State of:
—Rate discrimination charged, 115, 300
Utica, New York:
—New York State Railways (see Syracuse, N. Y.)
Utility information bureaus (see Public, Relations with)

## V

Valuation (see Appraisal of railway property)
Vancouver, British Columbia, Can.:
—British Columbia Electric Railway:
  Changing from left to right hand operation [Murrin], *894
  Coin and ticket sorter, *1073
  Crossover changes, 531; [Murrin], *894
  One man cars proposed, 536
  Paint shops economies [Murrin], *11
  Service at cost franchise sought, 217; Rejected, 374
  Wage reduction proposed, 1005, 1125
—City-railway controversy, 566
Vincennes, Indiana:
—Vincennes Traction Company:
  Foreclosure sale ordered, 258
  Reorganization plans, 1088
Virginia Railway & Power Company (see Richmond and Norfolk, Virginia)

## W

Wage decreases:
—Akron, Ohio, 68, 179, 216
—Anderson, Indiana, 215
—Auburn, N. Y., 531
—Average for August and September, 995
—Baltimore Maryland, 1083
—Beaver Valley Traction Co., 179
—Brooklyn, N. Y., 177
—Buffalo, N. Y., 218
—Chicago North Shore & Milwaukee R. R., 69
—Connecticut Company, 751, 794
—Covington, Kentucky, 216
—Dallas, Texas, 293
—Dayton, Ohio, 178
—Denver, Colorado, 293
—Des Moines, Iowa, 108
—East St. Louis & Suburban Ry., 179, 1042
—Fort Wayne, Indiana, 453, 564
—Haverhill, Mass., 293
—Indianapolis, Indiana, 215
—Industries listed, 361
—Jacksonville, Fla., 179
—Joliet, Illinois, 69
—Los Angeles, California 659, 709
—Louisville, Kentucky, 840, 877
—Marion & Bluffton Tr Co., 178
—Minneapolis, Minn., E. S. L. R., 794
—Monongahela Power & Railway Co., 68
—Montreal, Quebec, 294
—New Jersey & Pennsylvania Tr. Co., 145
—Newtonville, Mass., 414
—New York City, 177, 254
—Notice insufficient in St. Louis, 566
—Omaha, Nebraska, 565
—Philadelphia, Pa., 562
—Pittsburgh, Pennsylvania, 69, 145
—Pittsfield, Mass., 752
—Portland, Oregon, 564
—Proposed for:
  Baltimore, Maryland, 1005, 1083
  Covington, Ky., 178
  East St. Louis & Suburban Ry., 28, 179, 964
  Interborough Rapid Transit, 107
  Memphis, Tenn., 144
  Montreal, Quebec, 177, 217, 252, 294, 334, 566
  Seattle, Wash., 334
  Syracuse suburbans, 146, 179
  Vancouver, B. C., 1005, 1125
—Readjustment without rancor, Comments on, 157
—St. John, N. B., Can., 217
—San Francisco, Cal., 414
—San Francisco-Oakland Ter. Rys., 179, 294
—Scranton, Montrose & Binghamton Ry., 145
—Seattle, Washington, 374
—Seattle & Rainier Valley R.R., 1084
—Springfield, Ohio, 754
—Syracuse interurbans 179, 215
—Texas Electric Ry., 961
—Topeka, Kansas, 453
—West Penn Rys. 413
—Wheeling, West Virginia, 374
Wages and working agreements:
—Arbiters maintain, Schenectady, N. Y. 562
—Average increase in four years [Gruhl], 595
—Dependent on fares, 565
—Future of [Todd, by Bozell], 1018
—Improvements increase, Comments on, 1138
—Relation to fares [Green] 732
—Work commensurate with wages, Comments on, 79, 157; [Boyce], c 171
Waiting stations (see also Terminals):
—Advertisement presented, *996
—Attractive stations of C. & N. E. R.R., *1146
—Agents decreased in Chicago, *772
—Gates, Featherweight pressure in N. Y., *940
—Loading platforms in Indianapolis, *1147
—Raising elevated tracks for, in Chicago, 902
—Telephone announcers on trial, 27
Warehouse Point, Connecticut:
—Hartford & Springfield Street Railway:
  Freight operation, *47
  Report far Oct., 1918, to May, 1921, 112
Warsaw, Indiana:
—Winona Interurban Railway:
  Featuring localities in advertisements [Schade], *513
Washington, District of Columbia:
—Bus routes authorized, 340; Opposition to new routes, 969

Abbreviations: *Illustrated. c Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Washington, D. C. (Continued):
—Capital Traction Company
Cement mixtures, Accelerating settings of, 869
One-man car trial, 1132
—Fare controversy, 150, 223, 456
—Half fare for children urged, 800
—Municipal ownership proposed, 68
—Potomac Electric Company:
Valuation case, 995, 1089
—Railway merger, Legislation for, 337, 753
—Token fare decreased, 223; Unsatisfactory, 716
—Washington Railway & Electric Co.:
Depreciation controversy, 1089
Plow and circuit breaker testing, *139
Reclamation department, *98
Traffic decrease, 716
Trailers with controllers, *433
Washington, State of:
—Auto transportation act applied, 184; [Koykendall], 790
Washington Water Power Co. (see Spokane, Wash.)
Waste elimination:
—Discussion of by R. R. Div. A. S. M. E., 748
—Report of F. A. E. S., 173, 915; Comments on, 157
Waterloo, Iowa:
—Waterloo, Cedar Falls & Northern Railway:
Financial plans, 376
Weed cutter in Texas, *448
Welding:
—Eye protection, 10
—Frog repairs, *15
—Frogs with acute angles, *910
—Gas outfit, Portable, *99
—Reclamation work in Washington, D. C., 98
—Seam-welding rail joints, [Wysor] *170
—Thermit, Mixing necessary, 446
—Thermit, New molding material, 367
—Variable voltage motor-generator set, *140
Westchester Street Railroad (see White Plains, New York)
West End Terminal Railway (see Cincinnati, Ohio)
Western New York & Pennsyvania Traction Company (see Olean, N. Y.)
Western Pacific Railroad:
—Purchase of Sacramento Northern R.R., 454, 797
West Jersey & Seashore R.R. (see Camden, N. J.)
West Orange:
—West Orange Municipal Bus System:
Deficit reported, 834
West Penn Railways (see Pittsburgh, Pa.)
West Virginia, State of
—Bus petition rejected, 666
Wheeling, West Virginia:
—Bus company seeks permit, 801, 1092
—Jitney situation, 261
—Wheeling Public Service Corporation:
Bus competition withdrawn, 380
—Wheeling Traction Company:
Intrastate rates by I. C. C., 378
Wages decreased, 374
Wheels and axles:
—Axle failures caused by rough machining [Norton], 908
—Excessive braking, Effect on, 362
—Rolled finish on axles *692
—Storage and loading platforms, *193
—Stresses in steel car wheels, 142
—Wheel contours [A. E. R. E. A. Com.], 640
White Plains, New York:
—Westchester Street Railroad:
Annual report, 297
Wichita Falls, Texas:
—Wichita Falls Traction Company:
Decreasing accidents, 823
Wilmington, Delaware:
—Wilmington & Philadelphia Traction Company:
Financial difficulties, 879
Power plant changes, *232; Comments on, 267
Three-wire distribution [Way], *307; Comments on, 306
Winnipeg, Manitoba, Can.:
—Manitoba Power Company
Bond issue, 921
Hydro-electric power plant, 529
—Winnipeg Electric Railway:
Cadmium-copper trolley wire, 277
Winnipeg, Manitoba, Can.:
—Winnipeg Electric Railway (Continued):
Elements affecting riding [Dahl], 239
Fare increase, 222
Motor-generator sets rebuilt [Smith], *91
Repair shops rebuilt [Smith], *437
"Service" slogan adopted, *926
Three wire system for electrolysis mitigation, 839
Track voltage on [Smith], 555
Winona Interurban Railway (see Warsaw, Ind.),
Wisconsin, State of:
—Commission's history and work, *765
—Rate reveiew requested, 885
—Track abandonment bill vetoed, 149
Wisconsin Traction, Light, Heat & Power Co. (see Appleton, Wis.)
Wood (see also Poles and Ties)
—Air seasoning investigation, 209
—By-products from [George], *1059
Worcester, Massachusetts:
—Worcester Consolidated Street Railway:
Energy saving [Wood], *681
Freight operation, *41
Work and wrecking cars:
—Combination car, *348
—Pavement cutting device, *291
—Plow car and derrick, *208
—Snow plows (see Snow removal)

Y

York, Pennsylvania:
—York Railways:
Automatic substations instead of single phase, *543
Youngstown, Ohio:
—Pennsylvania-Ohio Electric Co.:
Interstate fare increased by I. C. C., *1091
Safety car experience [Smith], *20
—Youngstown Municipal Railway:
Physical property improved, 965
Routing and fare collection changes, 1051
Weekly pass analysis, *1104; Comments on, 1098
Weekly pass trial, 534, 665, *899; Comments on, 890, 1015

Abbreviations: *Illustrated. c Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

---

# PERSONAL INDEX

(with biographical notes)

A

Adair, Frank ..... 1054
Anderson, Clark G. ..... *226
Andrews, Brigadier-General Lincoln C. ..... 846
Anderson, F. A., ..... 1134
Armstrong, Robert D. ..... 460
Arnold, E. ..... 539
Atwood, William W. ..... 804

B

Bange, C. M. ..... 422
Barker, Ernest C. ..... 422
Baxter, C. A ..... 225
Bewsey, L. C. ..... 460
Bigelow, B. R. ..... *973
Blake, George H ..... 720
Bleecher, John S. ..... 1095
Bliss, Zenas W. ..... 574
Bowen, C. K. ..... 1164
Brendel, Wallace W. ..... 1054
Brewer, Joseph A. ..... 302
Brown, Nelson H. ..... *574
Buchanan, C. B. ..... *574
Buckley, A. W. ..... 264
Buckman, H. H. ..... 225
Butler, E. R. ..... 188

C

Cadby, John N ..... 887
Chandler C Murphy ..... 460
Cooley, Mortimer E ..... 720
Collins C. C ..... 422
Collins, John C. ..... 382
Cooper, H. S. ..... *538
Coryell, A. B. ..... 460
Couzens, H. H. ..... *928
Cox, Frederick, I. ..... 423
Crowley, R. J. ..... 342

D

Daggett, Captain George F ..... 225
Dalton, H. E. ..... 1094
Dame, Frank L. ..... *188
Davies, C E ..... 35
DeCamp, H. C. ..... 302
Dittrick, Alva R. ..... 668
Duffy, C. Nesbitt ..... 668

E

Edgar, Charles L. ..... 539

F

Fallon, B. J. ..... 76
Finlay, W. F., Jr. ..... 154, 1164
Fisher, E. L. ..... 226
Fisher, Dan ..... 760
Flad, Edward ..... 461
Flood, Henry, Jr. ..... 225
Fountain, H. A. ..... 668

G

Gaiman, H. O. ..... 1095
Gerry, M. H. ..... 887
Gerehart, Thomas ..... 720
Gest, Frank ..... 382
Goff F. H. ..... 187
Graham, George C. ..... 803
Greene, Prof. Arthur M. ..... 342

H

Haight, Judge Thomas H. G. ..... 846
Harris F. H. ..... 422
Harvell, John E. ..... *668
Harvey, D. W. ..... *928
Hasbrouck, H. C. ..... 804
Haw, Elmer P. ..... 575
Herrington, L. B. ..... 1164
Hill, Arthur D. ..... 460
Hill, W. V. ..... 76
Hines, Joseph P. ..... 1134
Hodges, A. LeRoy ..... 116
Holland, Judge William M. ..... *1094
Hukill, Edmund L. ..... 422
Huntoon, J. G. ..... *226

I

Irelan, Carl D. ..... 575

J

Jackson, Carl D. ..... *804

K

Karr, Frank ..... 1164
Kealy, Col. Philip J. ..... 1134
Klauder, Louis T. ..... 225

L

Launey, Reuel O. ..... 155
Lee, Lewis H. ..... 188

M

MacMillan, E. A. ..... 35
McKibben, L. Don ..... 382
McKinley, William B. ..... 225
Mayer, Judge Julius M. ..... 668
Mead, W. J. ..... *1134
Morgan, Clinton E. ..... *886
Murphy, Ernest A. ..... 1164
Murray, William S. ..... 225

N

Nash, Robert A. ..... 1164
Nichols, F. E. ..... 264

O

Oakley, Frank D. ..... *760
O'Donoghue, Francis J. ..... 154

P

Phillips, J. G. ..... 264
Plimpton, R. E. ..... 1094
Pontius, D. W. ..... *720
Potter, Albert E. ..... *760

R

Raush, M. S. ..... 1012
Reynolds, A. L. ..... 760
Rifenberick, Robert B. ..... 225
Roderick, T. C ..... *226
Ross, H. E. ..... 973

S

Smith, Daniel W. ..... *187
Smith, F. E. ..... 538
Smith, R. J. ..... *226
Starr, Linton K. ..... 116
Stotesbury, Edward T. ..... 35
Sundmaker, J. H. ..... *342
Sweatt, L. P., Jr. ..... *382

T

Titcomb, H. B. ..... *538
Torrens, W. J. ..... 846

V

Vanneman, Charles R. ..... 538
Van Ness, L. G. ..... 264

W

Wakelee, Edmund W. ..... 720
Walker, E. M. ..... *973
Ware, Herbert ..... 303
Welsh, J. W. ..... *116
Whalen, Charles E. ..... 154
Williams, Harry S. ..... 302
Wilson, Paul E. ..... *1134
Wilson, P. Ney ..... *886
Wolff, S. E. ..... 929

(*Indicates Portrait)

# AUTHOR INDEX

## A

Addinsell, H. M.:
—Considerations affecting the market for street railway securities, 592
—Status of electric railway, light and power securities, 831
Ainey, W. D. B.:
—Railway's problems, 18
Allen, R. L.:
—Features of overhead construction, Discussion, 632
Anderson, Frederick A.:
—Results of mutual benefit association, 1118
Andrews, H. L.:
—Bus and car costs compared, 769
Arkwright, P. S.:
—Speaking of noses, 137
Ashfield, Lord:
—The problem of the fare, 312
Ashton, Thomas G. A.:
—Effect of the one-man car on traffic hazard, 875
Atkinson, H. M.:
—Prosperity a co-operative game, 990
Aylesworth, M. H.:
—Customer-ownership of utilities, 791

## B

Babson, Roger W.:
—Street railways as an investment [With O. W. Hill], †601
Bale, Lawrence D.:
—Automatic substations in Cleveland, 58
Barnes, James P.:
—"Bus Transportation" discussed, c1149
—Pressing problems of public utilities, 786
—Relationship between management and men, a traffic factor, *450
—Safety car operation, 620
—The outlook for the electric railway industry, 998
Beeler, John A.:
—Increasing speed, Discussion, 650
Bibbins, J. R.:
—Terminal service possibilities of the electric railways, †591
Bigelow, B. R.:
—Selling the employee on salesmanship, *1111, 1143
Bishop, S. A.:
—Handling employees' claims, 873
Bolt, W. C.:
—Keeping cars on time, 1039
Bowman, John H.:
—Electric railway cost accounting, †700
Boyce, W. H.:
—Merchandising transportation, *131, *166, *353
—Practical personnel work, 19
—Wages commensurate with work done, c171
Bozell, Harold V.:
—Railways' financial cycle has come (Interview with Todd), 1018
Bradlee, Henry G.:
—Opinion on "Bus Transportation," c1036
Brown, Harry L.:
—The sales work of electric railways, *61
Bryan, W. E.
—Automatic substations, Discussion, 630
Budd, Britton I:
—Make your safety drive continuous, †605
Buffe, F. G.:
—Greater operating efficiency enables better merchandising of the service, *475
Burke, Walter H.:
—Street railway rates, *94
Butcher, C. A.:
—Automatic substation progress, *56
Butterworth, Louis H.:
—Constructive argument as opposed to destructive contentions in accident investigations and adjustment, †740

## C

Carr, Harvey S.:
—Regulation of public utilities, 211
Casey, Daniel, N.:
—The electric railway and the community, 18
Coates, F. R.:
—Reorganization of A. E. R. A., c444
Connell, H. J.:
—The relation of the claim department to other departments, 525
Cope, H. W.:
—Apprentice systems for railways, 626
Cram, R. C.:
—Reorganization of A. E. R. A., c365
—Unusual method of raising track, *895
Curwen, S. M.:
—Car purchases may be financed through car trusts, †590

## D

Dahl, C. H. D.:
—Measuring service to the public, 239
Dana, Edward:
—Auto use need not be abused, c52
—"Bus Transportation" discussed, c1149
—Five and ten-cent Boston fares, *47
—Reorganization of A. E. R. A., c362
—Service-at-cost contract franchise and state regulation, †587
Davis, W. L.
—Construction accounting, †703
—Stores accounting, Discussion, 697
Dean, John S.:
—Systematic maintenance good investment, *278
—Testing insulating materials, *85
—Testing railway motor detail parts, *427
Denman, B. J.:
—"Bus Transportation" discussed, c1149
Dinneen, George F.:
—Electric railway cost accounting, Discussion, 697
Doyle, H. B.:
—Correct method of purchasing railway supplies, †604
Dunham, William R., Jr.:
—The track department as a factor in the sale of transportation, *484

## E

Eaton, F. E.:
—Handling of light and power consumers accounts, 408
Eaton, R. W.:
—Joint crossing specifications, Discussion, 632
Eddy, H. C.:
—Baltimores' new type safety car, c732
Eichel, Eugene:
—Railway situation in Berlin, *814
Emery, J. A.:
—What merchandising means, c827
Emmons, C. D.:
—"Bus Transportation" discussed, *1149
"Engineer, Heavy Electric Traction":
—Need of definition for heavy electric traction suggested, c443
Ertel, Arthur:
—Traffic and housing in large cities, *199

## F

Farkell, G. C.:
—Drops and impression tests of steel rails [With F. M. Speller], 636
Farrell, A. M.:
—Bus competition in Illinois, Discussion, 747
Ferneding, T. A.:
—Substitute ties, 635
Fisher, F. E.:
—Bus competition in Illinois, Discussion, 747
Fitzgerald, T.:
—"Bus Transportation" discussed, c1149
Foote, F. J.:
—Air compressor piston clearances, 445
—Portable substation with collapsible construction, *169
Foster, S. L.
—Qualities of trolley wire, Discussion, 633
Frothingham, Francis E.:
—The basis of financial recuperation, 584

## G

Gadsden, Philip H.:
—Address to Penn. Street Ry. Assn., 17, 18
—How taxation affects public utilities, 212
—Presidential address to A. E. R. A., †609
—Put business common sense into electric railway managing, †581
Gates, A. B.:
—Care in construction and maintenance of overhead lines, 655
George, Howard H.:
—From tree to the finished stick, *1059.
Glover, M. W.:
—Electric railway cost accounting, Discussion, 697
Gluck, Sinclair:
—Automotive industry appraisal of traction men, 856
Goodwin, William L:
—Merchandising transportation, Discussion, 645
—Wanted, A transportation sales manager, *466
Gould, H. M.:
—Catenary construction, Discussion, 633
Gove, W. G.:
—Address to A. E. R. E. A., †624
Green, Alfred A.:
—The five-cent fare as it affects the electric railway employee, 732
Green, R. C.:
—Conducting accident investigations, 737
Grimsley, A. H.:
—Customer-ownerships securities, 787
Gruhl, Edwin:
—The traction industry today and four years ago, †595
Gunn, E. B.:
—The mechanical man as a salesman, 104

## H

Hagan, J. S.:
—Power costs at point of delivery on interurban electric railways, 409
Haig, Robert M.:
—Some aspects of the revenue act of 1921, 1068
Handlon, J. H.:
—Importance of claim department statistics, 656
Harkness, LeRoy T.:
—Transit tendencies in New York City, 403
Hester, J. E.:
—Using lye to remove old insulation, *14
Hill, Olin W.:
—Street railways as an investment [With R. W. Babson], 601
Holy, G. H. F.:
—The helical gear [with W. H. Phillips], *22
Hoover, Herbert:
—Relation of the electric railway industry to industrial efficiency, †580
Hopson, H. C.
—Adaptation of routine accounting results to particular uses, †705
—Making valuations under special circumstances, c443
Huber, Dr. E.:
—Electrification in Switzerland, *988
Hughes, Adrian Jr.:
—Hose bridges carried in trailer, *241
Huldschiner, E.:
—Valtellina Railway is extended, *816

## J

Jackson, Walter:
—Bus or retrack?, *315
—Railways must take up buses now, c523
—The weekly $1 pass in Wisconsin, *203
—Trackless trolleys at work abroad, *859, *1027
Jones, Charles H.:
—Automatic substations, 60
Jones, C. R.:
—A single phase veteran, *907

## K

Kappeyne, J.:
—Revenue increases from increased rates, *954
Kelker, R. F., Jr.:
—Accident record shows improvement, *244
Kelsay, Guy H.:
—The satisfied employee, 64
King, L. B.:
—Valuation and rate of return, 104
Koykendall, E. V.:
—Regulation of buses in Washington, 789

## L

Lambert, M. B.:
—The electric railway, track and all, 554
Leeming, John:
—Employee selection, Discussion, 654
Lemmon, H. A.:
—What is service?, 442
Lewis, Dwight N.:
—Des Moines transportation situation, 791
Litchfield, Norman:
—The car as a transportation salesman, *491
Lloyd, C. F.:
—Automatic Substations, Discussion, 630
Lloyd, M. G.:
—Joint crossing specifications, Discussion, 632
Lonergan, F. J.:
—The genteel faker, 874
Luellen, R. E.:
—The human side of energy saving, *728

## M

Manz M. W.:
—Span length in overhead construction, Discussion, 632
Martinet, J. J. W. Van Loenen:
—Electrification in Holland, 988
Mattersdorff, Ing. Wilhelm:
—Ten years of the Hamburg Elevated Railway, *979
May, I. A.:
—Perpetual inventory as a part of accountants' record, *398
McCahill, C. B.:
—Profit sharing on P. H. B. & N. C. Ry., 18
McCollum, Burton:
—Measurement of earth currents, *809
McGraw, James H.:
—What business papers can do to speed the revival of business, †835
McGunnegle, C. K.:
—What automobile traffic means to Pittsburgh [with M. T. Montgomery], 21
McKelway, G. H.:
—Bond testing cars, *82
—Electric trucks for line repairs, *944
—Gaging trolley wire for renewal, 904
—Pasting skip-stop signs on poles, 1076.
McWhirter, J. S.:
—Relation of the equipment man to the sale of transportation, *489
Messenger, R. S.:
—Railroad crossings and crossing signs, 744
Milliken, J. H.:
—Rectifier substations developed abroad, *779

Abbreviations: *Illustrated. †Portrait. c. Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Montgomery, M. T.:
—What automobile traffic means to Pittsburgh [with C. K. McGunnegle], 21
Moore, W. H.:
—Publicity in litigated cases, 792
Morgan, Clinton E.:
—Making transportation serve—and sell, *499
Morrow, L. W. W.:
—The lubrication of rolling stock, *674
Mortimer, James D.:
—Reorganization of A. E. R. A., c365
Muldaur, George B.:
—The underwriters' laboratories and its work, †594
Mullet, H. A.:
—Safety car operation in Milwaukee, 620
Murrin, W. G.:
—Changing from left to right hand operation, *894
—Introducing economies in the paint shop, *11
Myers, George L.:
—Winning public support and confidence, 210

## N

Newman, J. K.:
—The future of street railway financing, 583
Norene, O. A.:
—Small oven proves useful, *142
Norris, Henry H.:
—Heavy electric traction, Discussion, 627
—Picking men for jobs in the transportation department, †607
Norton, Arthur:
—Rough machining cause of axle failures, 908

## O

O'Brian, John O.:
—Police traffic regulations of New York City, 603
"Observer":
—Des Moines rides buses and walks *283
—Soliciting and advertising for freight and passenger traffic, *505
—We can help ourselves through helping others, c1072
Osborne, Harry V.
—Jitney situation in New Jersey, Discussion [N. A. R. U. C.], 789
Otis, Stanley, L.:
—Workmen's compensation in New York, 912
O'Toole, J. L.:
—Co-operative electric and steam freight handling, 878

## P

Palmer, L. H.:
—Baltimore's new trail cars, *891
—Baltimore's new type safety cars *400
—Why Baltimore departed from the standard car, c96
Pearson, Gardner W.:
—Are the trolleys the only practical system of transportation? 866
Peirce, Cyrus:
—Amortization of discount on new securities, 872
Pellissier, George E.:
—What the railway company requires and what it should buy, 784
Pendergast, William A.:
—City participation in utility, ownership, 710
Perry, Charles T.:
—Some service results of ball bearings, *905
Perry, James A.:
—Appeal for reason in utility regulation, 787
Phillips, W. H.:
—The helical gear [with G. H. F. Holy], *22
Porter, J. T.:
—Economies from use of ball bearings, 288
Prather, R. V.:
—Bus competition in Illinois, 747
Price, E. C.
—Welding joints, Discussion, 636
Putnam Frank:
—Competitive merchandising necessary, c444

## Q

Quigley, J. M.:
—Traffic regulations and safety work, †606

## R

Rau, O. M.:
—Burning pulverized anthracite mine waste *945
Reid, Harry:
—Service will increase transportation, Discussion, 646
Reynolds, John J.:
—Address to A. E. R. C. A., †735
Rice, C. G.:
—Transportation allied with claim work, Discussion, 648
Ridgway, Robert:
—Subways for city transportation, 833
Roadifer, Laura M.:
—Eject the Grundys, 745
Roberts, A. A.:
—Automatic train registering, *440
Robinson, Walter E.
—Method of handling accidents and claims, †739
Rodgers, W. S.:
—Competition and co-operation, 63
Rogers, W. H.:
—The soul of service, 875
Rosenberger, William A.:
—Steam-heating electric trains in Switzerland *206
Rosevear, M. B.:
—Joint crossing specifications, Discussion, 632
Roosevelt, G. H.
—Automatic substations, Discussion, 630
Rudd E. Irvine:
—Traffic regulation has its difficulties, c52
Rust, T. E.:
—Track maintenance in Waterloo, Iowa

## S

Sanders, Fielder:
—Service-at-cost idea sound, 1154
Sargent, F. W.:
—Brake shoes, brake heads etc., 641
Savage, H. D.:
—Burning pulverized coal, 629
—The use of powdered fuel under steam boilers, 172
Sawtelle, E. S.:
—European business poor, 887
Sawyer, W. H.:
—Reorganization of A E. R. A., c363
Schade, J. C.:
—Railways could profitably undertake joint advertising campaigns, *513
Schiemann, Max:
—Six years of trackless trolleys, 1023
Scofield, E. H:
—Stoker experiments, 629
Scott, L. E.:
—Preventing overhead corrosion, *1079
See Pierre V. C.:
—How the equipment man can aid in reducing costs, *684
Seelar, L. F.:
—Springs for easy riding cars, 275
Shannahan, J. N.:
—Reorganization of A. E. R. A., c523
Shipley, J. W.:
—Self corrosion of cast iron and other metals in alkaline soils (with W. N. Smith), 911
Shoup, Paul:
—Reorganization of A. E. R. A., c523
Simmon, Karl F.:
—The field of the trolley bus, *394
Smith, Clinton D.:
—Experience with the one-man car, *20
Smith, R. J.:
—Inspiring employees to merchandising transportation service, 421
—Track maintenance and construction kinks, 527
Smith, W. Nelson:
—Railway motor-generators in Winnipeg rebuilt, *91
—Repair shops rebuilt in Winnipeg, *437
—Self-corrosion, not stray current electrolysis at Selkirk, Manitoba, c52
—Self corrosion of cast iron and other metals in alkaline soils (with J W. Shipley), 911
—Track voltage with three-wire system, *c555 6
Soules, E E:
—The trend in advertising the electric railway, 748
Speller, F. M.:
—Drop and impression tests of steel rails [with G. C. Farkell], 636
Sproul Thomas:
—Joint crossing specifications, Discussion, 632
Staples, Horace A.:
—Discussion on trolley wire, 633, c827
Stevens, R. P.:
—Address to A. E. R. T & T, †643
Stocks, C. W.:
—The bus transportation field, *517
—Why the figures differ, 771
Storrs, L. S.:
—Reorganization of A. E. R. A., c402

## T

Thirlwall, J. C.:
—Improvements in electric railway equipment, 784
—The urban transportation field analyzed, *546
Thomas, W. P.:
—Student trainmen given claims work, 524
Tingley, C. L. S.:
—The relation of rates to service, 999
Todd, Robert I.:
—Indeterminate franchise indorsed, †589
—Railways' financial cycle has come (Interview by Bozell), †1018
Treat, Dean:
—Electric railway lubrication, 914
Turner, Daniel L.:
—New Jersey commuter in New York subway, 1151
—Rerouting in Manhattan, *1109

## W

Walker, E. M.:
—Salesmanship, Discussion, 646
Waller, E. P.:
—Apprentice systems, 626
Warren, Frank H.:
—How can salesmanship be applied in th street railway business?, 985
Way, A. P.:
—Three-wire railway distribution in Wilmington, *307
Way, S. B.:
—Contrasted advantages of service-at-cost contract franchises and state regulation, †589
Webster, F. E.:
—Address to A. E. R. A. A., †695
Weedon, Bert:
—Merchandising transportation, 64
Weeks, H. E.:
—Sale of securities by utilities, 65
Wehle, Louis B.:
—Taxation for railway construction, 552
Welsh, James W.:
—Annual convention issue, c555
Welsh, M. A.:
—Transportation in Waterloo, Iowa, 524
West, Edward A.:
—"Bus Transportation" discussed, c1150
Westlake, C. P.:
—Providing a repair shop with little money, *897
Wheelwright, Thomas:
—Trolley bus an evolution, not revolution, 710
Whitman, E. B.:
—Bus situation in Maryland [Whitman], 790
Whitney, Howard F.:
—Troubles of keeping cars on time, 1038
Wickwire, E. F.:
—The interest of the manufacturer in the electric railway industry, 599
Williams, T. S.:
—Commissions tentative plan criticized 1080
Wilson, P. Ney:
—Track labor costs, *438
Wilson, Robert L:
—Employee selection, Discussion, 654
Witt, Peter:
—Seattles' transportation needs, 1041, 1125
Wood, C. Verner, Jr.:
—Follow-up system for power saving, *681
Woodbridge, J. E.:
—Downtown substation in San Francisco, *269
Woods G. M:
—Tendency in train operation, *395
Wysor, W. W.:
—Successful use of welded joints in Baltimore, *170

## Y

Yost, C. E.:
—Construction accounting, Discussion, 698

Abbreviations: *Illustrated. †Portrait. c Communications.
READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

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*Vol. 58, No. 1* New York, July 2, 1921 [illegible] 38

# Electric Railway Journal

**Henry W. Blake** and **Harold V. Bozell**, Editors
**Henry H. Norris**, Managing-Editor

## *Contents*

### How an Interurban Line Developed a Freight Business

Extensive improvements of the Indianapolis-Louisville line include new freight equipment and overnight freight service. Interesting layout of new shops under construction is treated. Thorough canvass for freight is made. Method of financing betterments is explained..............................Page 3

### Some Recent Interurban Car Designs

While very few interurban cars are being constructed at this time, the accompanying information regarding four types recently ordered will indicate the trend of practice in this field..........................................Page 5

### The Pennsylvania Association at the State Capital

Philip H. Gadsden, Chairman W. D. B. Ainey and Dr. F. H. Snow, of the engineering deparment of the State Commission; State Librarian T. L. Montgomery and D. N. Casey, field director State Chamber of Commerce, addressed the convention. President T. B. Donnelly re-elected.............................Page 17

EDITORIALS .................................... 1
REFUSE LOADING PLATFORM SAVES LABOR....... 5
INTRODUCING ECONOMIES IN THE PAINT SHOP.. 11
ELECTRIFICATION AT EDINBURGH.............. 12
GERMANY STICKS TO SINGLE PHASE........... 14
NEW HIGH-VOLTAGE LINE IN ARKANSAS....... 14
USING LYE TO REMOVE OLD INSULATION........ 14
BUILDING FROGS IN ATLANTA.................. 15
MAINTAINING BRICK CROSSING................. 16
EFFECTIVE AIR SANDER......................... 16
EQUIPMENT MEN DISCUSS PROBLEMS.......... 23
RAIL-LESS TRANSPORTATION TO BE TAKEN UP BY NEW ENGLAND CLUB...................... 24
AMERICAN ASSOCIATION NEWS................ 24
RECENT HAPPENINGS IN GREAT BRITAIN........ 25
NEWS OF THE ELECTRIC RAILWAYS............. 26
FINANCIAL AND CORPORATE................... 29
TRAFFIC AND TRANSPORTATION................ 32
PERSONAL MENTION........................... 35
MANUFACTURES AND THE MARKETS............. 36

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Advertising Index—Alphabetical, 54; Classified, 48, 50, 52; Searchlight Section, 46-47

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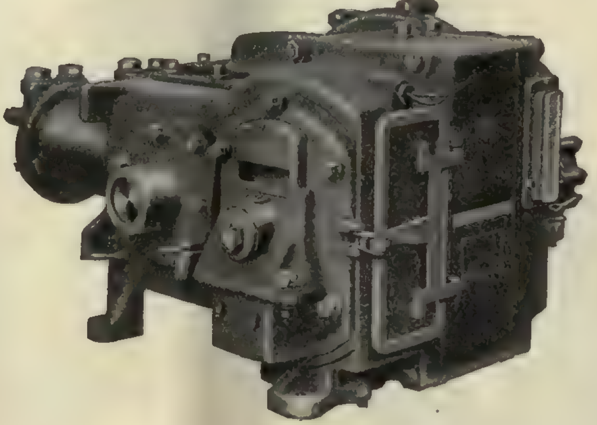

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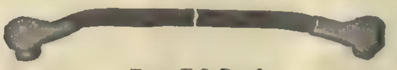

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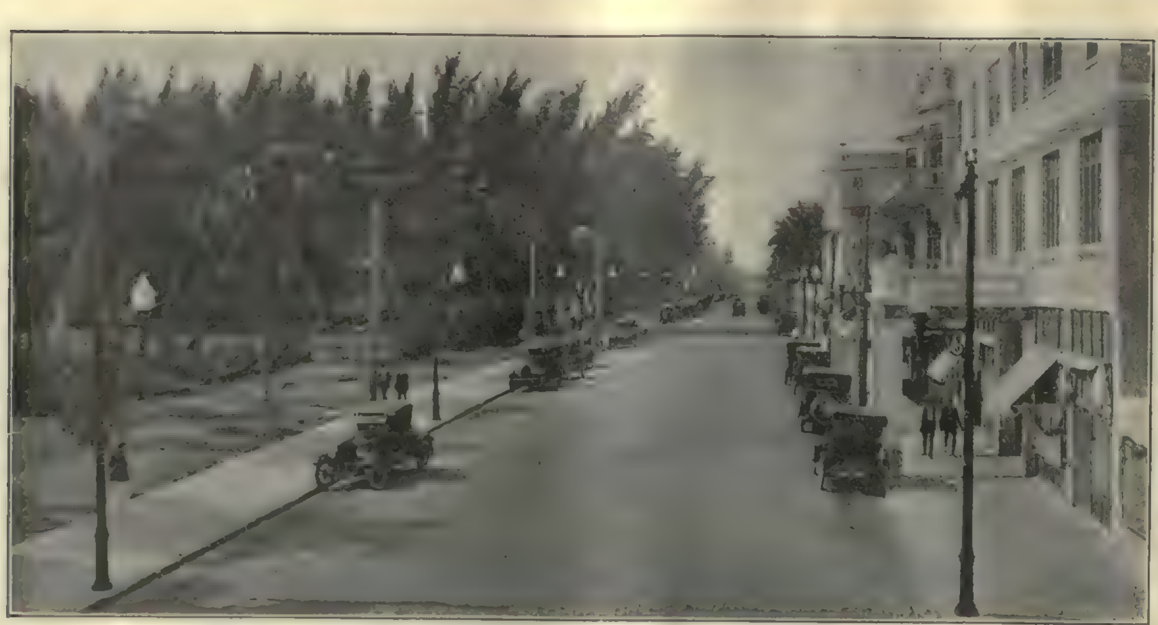

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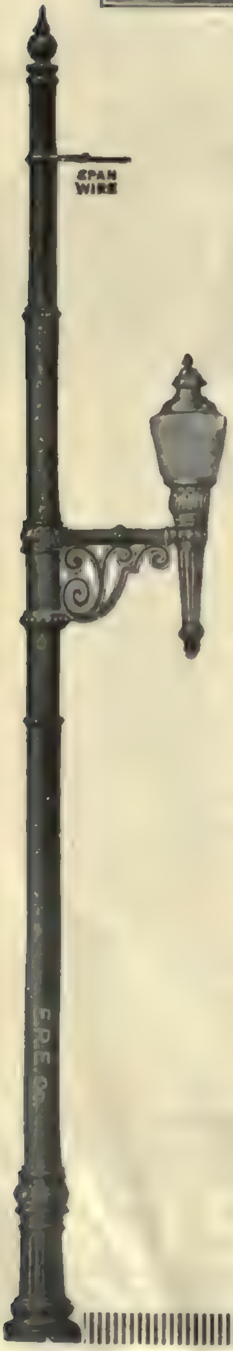

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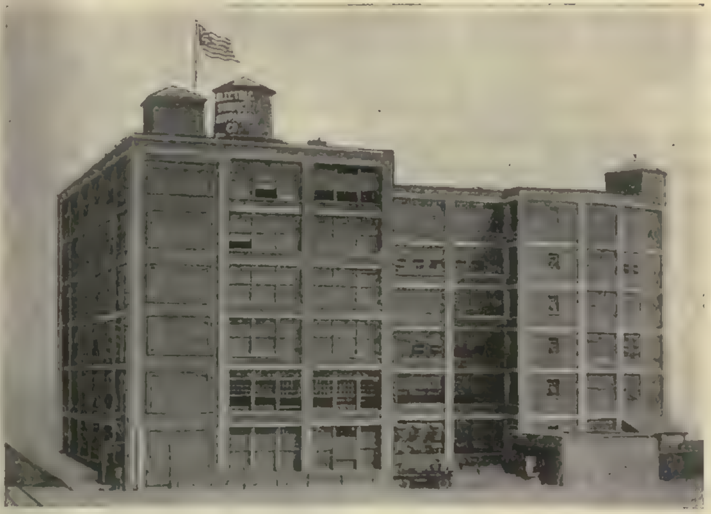

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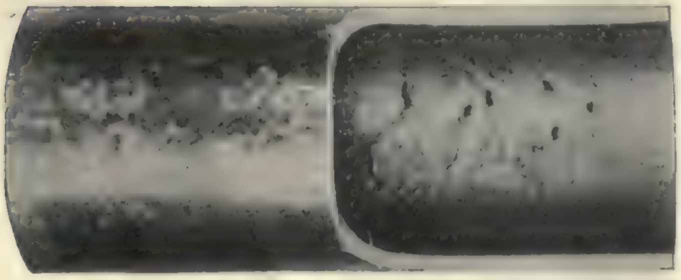
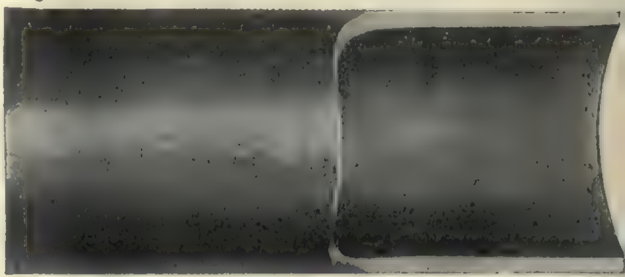


*Ordinary black butt-weld pipe, showing characteristic coating of welding-scale*



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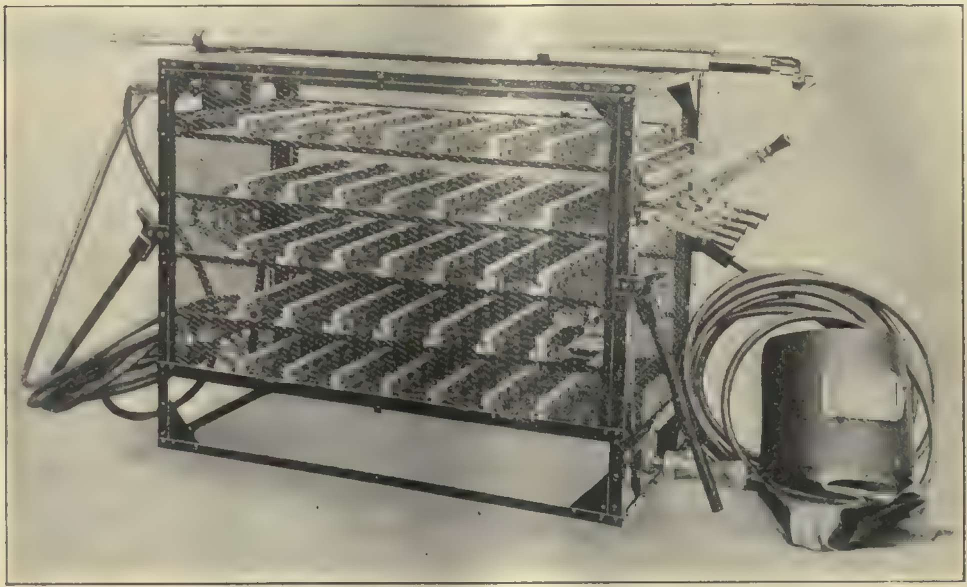

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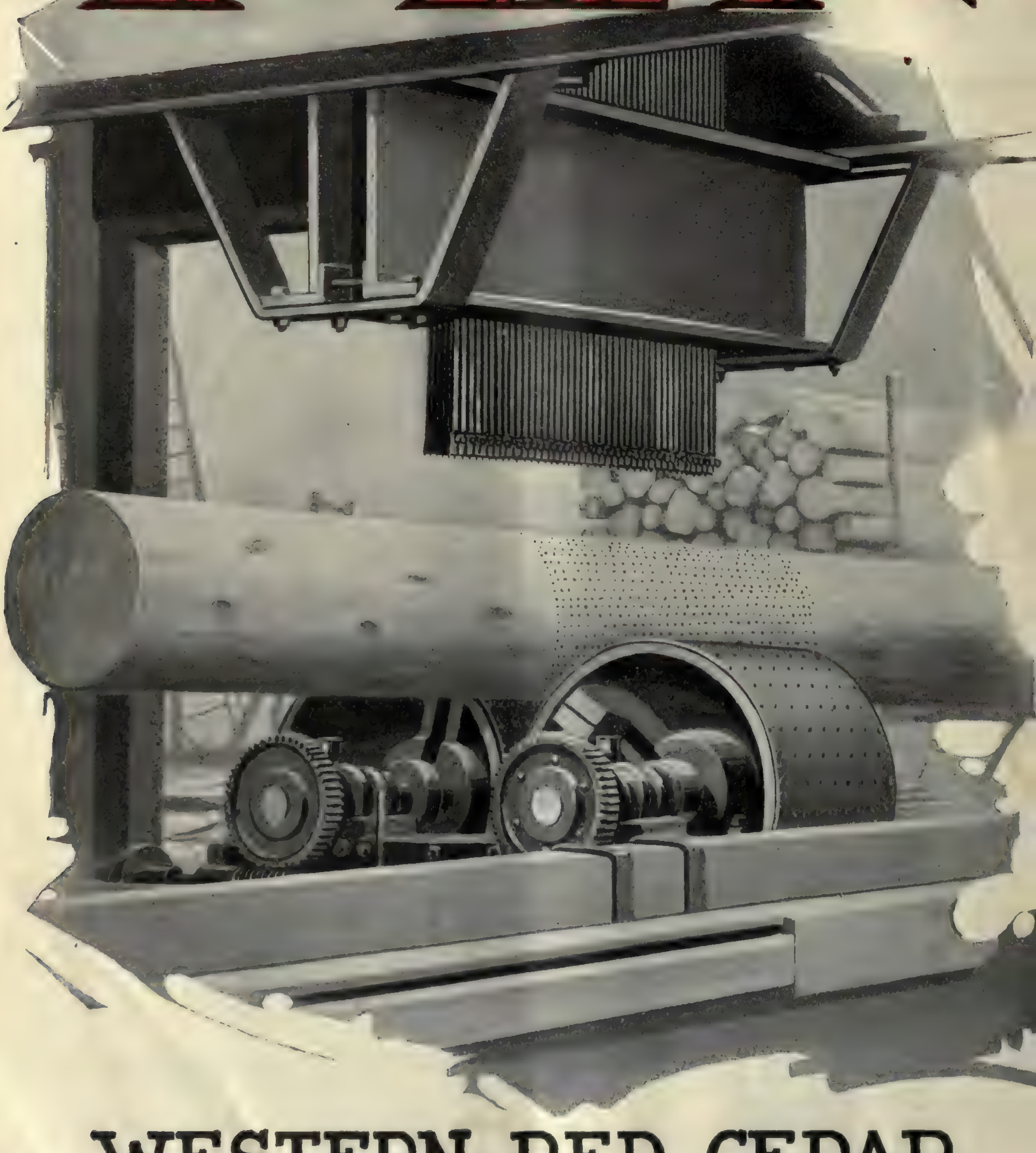

WESTERN RED CEDAR

# TREX

*(Reg. applied for U. S. Pat. Off. Process fully covered by patents.)*

## A New Method of Treating Western Red Cedar Poles

WESTERN red cedar is recognized by all competent authorities as one of the most durable woods. Poles made from this timber are light in weight, low in cost, durable, strong, sightly, safe and adaptable—qualities which all transmission engineers agree are vital requisites for pole line supports.

Pentrex poles have all the good qualities of red cedar plus extra longevity given them by our special puncture process of butt treating. This process revolutionizes pole preservation. It makes possible a durability that means an immense saving in replacements!

The photograph shows the wonderful, patented machine with which we puncture Pentrex poles. The puncturing is done by forty-two iron bars. Each bar is equipped at the bottom with a detachable point holder so the depth and spacing can be regulated. As each bar works independently, irregularities of the pole are taken care of.

By the Pentrex method, the depth of penetration can be accurately gauged and a good saturation obtained. A scientific penetration of preservative at the groundline area is insured.

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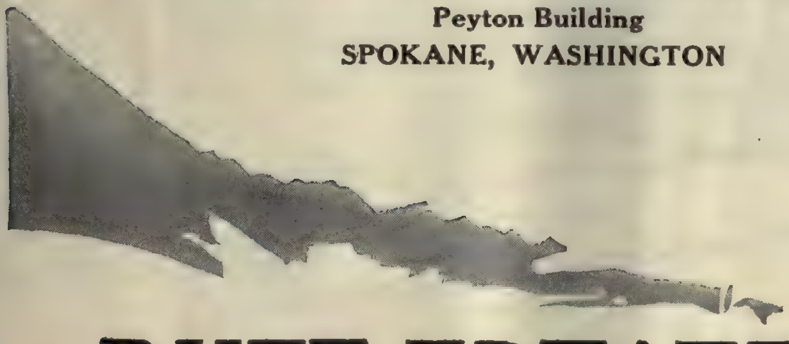
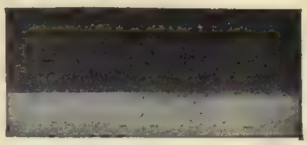
## WESTERN RED CEDAR ASSOCIATION

**Peyton Building**
**SPOKANE, WASHINGTON**



Non-punctured
(BELOW)
Area of pole (at butt) showing penetration of preservative secured by the ordinary open tank method.



Pentrex-ed
(ABOVE)
Same pole, showing how Pentrex patented process enables preservative to attain a deep penetration.

## BUTT-TREATED POLES

# ERICO Arc Weld Bonds

are manufactured in a plant which has devoted 17 years solely to the development and perfection of brazed and arc weld bonds and apparatus essential to their application.

## *Result*—ERICO Bonds are Right

Type "ATF" Bond

Every bond requirement can be met with an ERICO bond; long or short, ribbon or cable, single or double conductor, of any capacity.

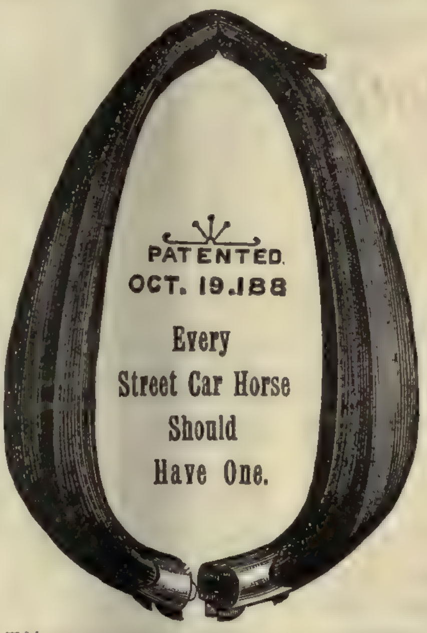
ERICO bonds may be applied with any arc welding equipment, but more easily with the lightest, most portable equipment on the market, the

## ERICO Arc Welding Outfit

600 Volt 200 Amp. 100 Pound Outfit

THE ELECTRIC RAILWAY IMPROVEMENT CO.
Cleveland, Ohio

THE progress of an industry is inseparably linked up with the progressiveness of the manufacturers of the equipment, materials and supplies without which the industry's work could not be done. In the electric railway industry, the co-operation between operating men and manufacturers has always been hearty.



*Thirty-two years ago—One of the exhibits in the* 1889 *Convention Issue.*

Operating men realize that their own best interests were in perfect harmony with those of the manufacturers. It is characteristic of the modern electric railway man to be ever on the alert for new or improved equipment, materials or supplies.

As a result, the Exhibit has always been a strong feature of the annual convention of the American Electric Railway Association and in the exhibit section of the Electric Railway Journals' annual convention issue. The exhibit at the convention and the exhibit in the Journal shared the attention of the electric railway industry.

This year there will be no exhibit at the convention and the entire attention of the entire industry will depend on the Electric Railway Journal to provide an adequate convention exhibit in its advertising pages.

The opportunity and the responsibility are both welcomed. With the co-operation of the industry's most progressive manufacturers Electric Railway Journal has in preparation a Convention Issue that will more than uphold a generation-old record of service. It will be dated September 24.

ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, NEW YORK

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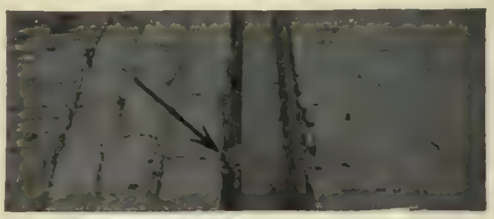
1

2



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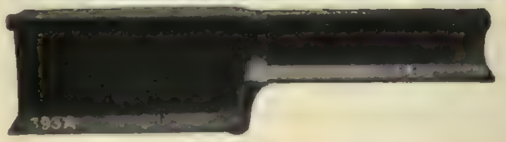

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**1—Thermit Welded Frogs and Crossings.**

Long lived, but cost only fraction of cost of solid manganese frogs. Unlike latter, they can be welded in place and built up, and they require no bonds. Easily and cheaply constructed in railroad shops by welding together spare pieces of rails.

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The only method which absolutely eliminates rail joints in paved streets.

**4 and 5—Repairing Broken Motor Cases and Truck Frames.**

The only method for this class of reclamation work which can be depended on to give a reliable repair which will stand up in service.

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# Going a Step Further

Fifty years of specialization in one particular branch of the oil business — *railway lubrication,* has developed Galena Oils to a state of perfection that they are recognized everywhere as the highest grade railway oils possible to manufacture.

But it is not the policy of this company to rest content with the creation of *better lubrication,* hence the development of *better lubrication service,* as exemplified in the master organization of specialists known as the Galena Mechanical Expert Department.

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# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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*Volume* 58 New York, Saturday, July 2, 1921 *Number* 1

### Why the Helical Gear Interests Master Mechanics

EQUIPMENT men and others who attended the recent Harrisburg meeting of the Pennsylvania Street Railway Association were the recipients of much information regarding helical gear design and operation in the paper by Messrs. Phillips and Holy. Unfortunately the paper came near the end of a busy session, and there was no time available for discussion. Further, the paper was of a technical character and only those who were conversant with the subject would have been capable of discussing it even if there had been a chance. The paper is, therefore, printed in extended abstract in this issue of the ELECTRIC RAILWAY JOURNAL and the points which were raised in it can very properly be discussed in these columns so that equipment men generally may benefit.

The helical gear is attracting attention for three or perhaps four reasons: The chief one is that operating men expect to obtain longer life from their gearing. Helical gearing promises quieter running as compared with the spur gear now most generally used, hence will be better for the public; the reduction in tooth vibration which its use insures will lower maintenance cost, which will please the railway management, and it is a technical development in equipment design and construction, thus affording stimulating engineering problems to the alert superintendent of equipment.

The gearing is a part of the propelling machinery of the electric railway car that has been difficult to change to meet advances in technical information. Interchangeability, regardless of age, is a practically essential feature here. The present contours of spur gear teeth were laid out many years ago in the light of the best information then available, and they have proved reasonably satisfactory. Once fixed, however, practically no change has taken place. However, the material in both gears and pinions has been wonderfully improved, so that the spur gear can now be considered well nigh perfect except for defects inherent first in even a perfect tooth, if such is possible, and, second, in the actual present standard tooth, which is a compromise among conflicting conditions complicated by impracticability of making radical changes.

As the authors pointed out in the paper, the advent of the helical tooth in electric railway gearing permits gear manufacturers to cut loose from existing contours and to introduce improvements which they will be glad to apply on spur gears if they have the opportunity. In the helical gear they are not hampered by the necessity for interchangeability with existing equipment, and they can, therefore, while gaining the advantages of the helical form of tooth, add to them the virtues of a new design of contour. This design aims to give increased strength and better wearing qualities, with greater rolling and less sliding action.

The alacrity with which master mechanics have undertaken experiments with helical gears shows that they appreciate the defects of the spur gear. The principal defect is that it produces vibration as the teeth are stressed in succession. Each tooth is of course deflected as it comes into action, returning to normal position with respect to its anchorage as it goes out of action, its maximum deflection occurring when it is carrying the load alone. That this vibration causes losses was explained in an article by G. W. Remington in the issue of this paper for Aug. 17, 1918, page 288. A flexible mounting of the gear was proposed to overcome the difficulty following the same general line as that in some designs for electric locomotives. The helical drive accomplishes much the same purpose, in a cheaper and simpler manner and in addition assures a more nearly uniform transfer of load from tooth to tooth. These gears are used in some other machinery besides that of electric traction drive and the experience thus gained outside of this field will be useful within it.

It would be helpful to have some instructive facts as to helical gears brought out at the meeting of the Engineering Association at Atlantic City next October. That will furnish an excellent occasion for asking questions of manufacturers and users, as to recent experience with the large number of helical gears which have been in use during the past few years.

### What Characterizes a Good Convention Paper?

ELECTRIC railway men spend in the aggregate a large number of man-hours at conventions annually. They naturally want to get something for their effort, and as their employers are the ones who largely "foot the bills" the latter expect a reasonable return on their investment. These facts ought to be weighed carefully by committees responsible for the programs of meetings. A look forward to the fall and later conventions and one backward in review over those of the past year or so may well be taken, so that the lessons of the past may be helpful in the plans of the future. This is the more important because some convention programs have been somewhat disappointing when the actual results have been compared with the ideal. This remark naturally raises the question: "What is an ideal program and an ideal paper for a convention?" Here are some suggestions along this line:

Obviously a program as a whole and the units composing it must be adapted to the needs of the audience. There are at least three such needs, aside from that for good fellowship and general inspiration. First, the association which is in conference needs a general view of the outstanding questions of its industry. This is necessary so that intelligent interest in managerial questions should be possessed by the staff generally. Second, the men in convention can profit by nontechnical accounts of the outstanding things that are being done by the specialists. Third, the specialists themselves ought to have their own respective questions discussed in ways to make them better specialists. This means sectional or group meetings.

As to the first point mentioned, any man who has attended conventions at all has heard enough good addresses which were full of "perspective" to know when a speaker is generalizing too much, beating around the bush, or rambling from the subject altogether. He is therefore apt to be critical when he feels that his time is being wasted. It is up to a program committee so to co-operate with an invited speaker that the latter will know what he is expected to cover. This is only fair both to the speaker and to the audience. A little tact will accomplish much here.

The second suggestion above is prompted by the fact that valuable papers on highly technical subjects often lack some degree of perfect success in delivery because presented, in the prepared form, before the wrong audience. Before a selected group, such as the specialists mentioned, a paper of this kind would produce exactly the result desired.

Convention programs in the electric railway field are good, many are excellent. These suggestions are made in the belief that they can be made even better by still more careful planning.

## Bus or Bust— A Possible Contingency

IN LAST week's issue the Connecticut Company was reported as another electric railway about to operate motor buses. This company, which recently received the necessary legislative authority, announced that motor bus service will be established on some long-needed extensions and for cross-route connections, that is, as supplementary and complementary service to the trolley system. In some communities there exists a feeling that the trolley has had its day and that, because this is a motor age, transportation should be by that agency alone. But it can easily be proved that for routes of fair traffic density, on an equal basis of seat-miles furnished, the trolley car is the more economical in operating costs including fixed charges, as well as taking less space in the streets. With lower density of traffic, the bus will often prove the more economical.

Of course, economy per mile operated is not the only standard on which to judge service. Transportation has its commercial as well as its financial characteristics. If the rider demands a particular service and is willing to pay for it on a basis which will provide a fair return on the investment and an allowance for maintaining at all times the integrity of the investment, it is but reasonable to expect that such a form of service will be provided. If buses are demanded, their service in some cases may have to overlap, at least in part, existing rail service, but in the interest of economical operation this duplication should be kept to a minimum by a co-ordination of both operations under one management. Obviously this unified operation should be under the direction of the railway management as the most experienced and capable agency for this work. In other words, if the bus is demanded to supply a real transportation need and the community is prepared to support it, the railway company should be prepared to furnish the service. Otherwise it may become a case of "Bus or Bust."

## Abandoned Lines Result from Faulty Diagnosis

A DECREASE of 623 miles of track in operation as against 167 miles of new extensions during 1920 is one of the indications that many electric railways were built in territories whose growth in traffic and revenue have been insufficient to keep pace with the rising cost of operation. There are probably many other miles of track being operated at great loss in similar localities. Whatever the reason for this—increased private automobile travel, failure to obtain increased fares, or whatnot—this well known condition exists. But while the financial condition of the individual railways which have discontinued service may be improved, what of the welfare of the communities served? In many of them the whole development was based on the transportation service, now defunct.

In order to maintain transportation service to such communities subsidies from the general fund of municipalities have been suggested and sometimes tried, but this seems questionable, at least until the operating company has properly studied, prescribed and tried all possible cures in the way of suitable operating economies. Among other things, these economies mean that lighter weight cars with lighter equipment may be substituted, that speed be increased, that one-man operation be tried, and that service be confined to less than eighteen hours per day.

Even then, the railway, having done everything within its power to demonstrate that the route has not an earning capacity sufficient to maintain rail service, can logically resort to the same means of transportation services that will be taken up by individual operators the moment cars are withdrawn. This means that rail-less traction can often be substituted where the highways are built so that they will stand such traffic.

Certainly, any company prior to the actual discontinuance of service should give careful consideration to the possibilities of this form of transportation and should not give up a franchise on a given route until it has been proved conclusively that the territory cannot support any regular means of transportation at all. The advantages of such action on the part of the company are almost too self-evident to require repetition—maintenance of the integrity of one universal transportation system, retention of public confidence and good will, prevention of jeopardizing other parts of the system, etc. It is good business to make a careful business diagnosis and to seek every remedy available to cure the apparent ills.

## A Model for Operating Men's Meetings

A GOOD example of the value of conventions among electric railway men is afforded in the gatherings of the mechanical men of Pennsylvania, Ohio and West Virginia, one of their meetings being covered in this issue. Their sessions begin promptly; they get right down to business, and they stick strictly to it throughout the meeting. Their procedure is largely informal as is also their organization, but the information brought out in answering questions raised and in exchanging experience is invaluable. There is a noticeable absence of lost motion and waste of time. A manager makes no mistake in sending his master mechanic to them. The success of these meetings has demonstrated that similar meetings could very profitably be provided in other sections of the country.

# Developing a Freight Business

### Extensive Improvements of Indianapolis-Louisville Line Include New Freight Equipment and Overnight Freight Service—Interesting Layout of New Shops Under Construction Is Treated—Method of Financing Betterments Is Explained

AN ACCOUNT of the passenger equipment of the Interstate Public Service Company, operating a high-speed interurban electric railway between Indianapolis & Louisville, was published in the issue of this paper for June 4. The company also does a considerable freight business and during the last year has increased its facilities for handling freight by the purchase of twenty new box cars and two electric locomotives.

In the main, these box cars are a copy of the standard Pennsylvania Railroad box car with a few alterations to meet the operating conditions of the electric line and to conform to certain standards adopted in the Central Electric Railway Association territory. They are 37 ft. 2½ in. long over the end sills, but the square end used by the steam railways was replaced by a round end, built on a 5-ft. radius to meet the standard C. E. R. A. drawbar requirements, so that the length of the car over bumpers is 42 ft. 4¾ in. These rounding ends increase the capacity of the standard Pennsylvania car by about 140 cu.ft. They are 39 ft. 4 in. long inside and 7 ft. 9 in. wide and 7 ft. 4 in. high. The roof is of plain arch construction, built with ⅞-in. tongue and grooved pine, a layer of 7-in. felt paper and covered with No. 8 duck, instead of the wood roof used by the steam roads. The standard MCB arch-bar freight truck is used, but it is stiffened by tying the ends of the side frames together at both ends of the truck with a bar bolted on the pedestal bolts of the arch bars. The hand-brake wheels are installed on the ends of the cars instead of on top, so that a brakeman will not need to get on top of the car where he might come in contact with the overhead.

These cars weigh 33,400 lb. and have a capacity of 50,000 lb. The Interstate company has standardized on this design of box car.

One of the two locomotives purchased by the company is a 37½-ton machine equipped with four Westinghouse 75-hp. 318 motors and St. Louis trucks. The other locomotive is a new 25-ton engine equipped with four 50-hp. GE-57 motors and St. Louis trucks.

With these new purchases of freight equipment, the total facilities for handling freight business now include six motor merchandise cars, two locomotives, thirty box cars and twelve flat cars. Three of the motor merchandise cars have been rebuilt so that they are capable of pulling as many as twelve box cars. At the present time it is unnecessary to run trains of more than five or six cars, and a four-car train is the limit that may be hauled through the streets of Louisville or Indianapolis, according to ordinance in the latter and an order of the Board of Works in the former. The locomotives, of course, are capable of handling longer trains. They are used very largely in hauling gravel and cement.

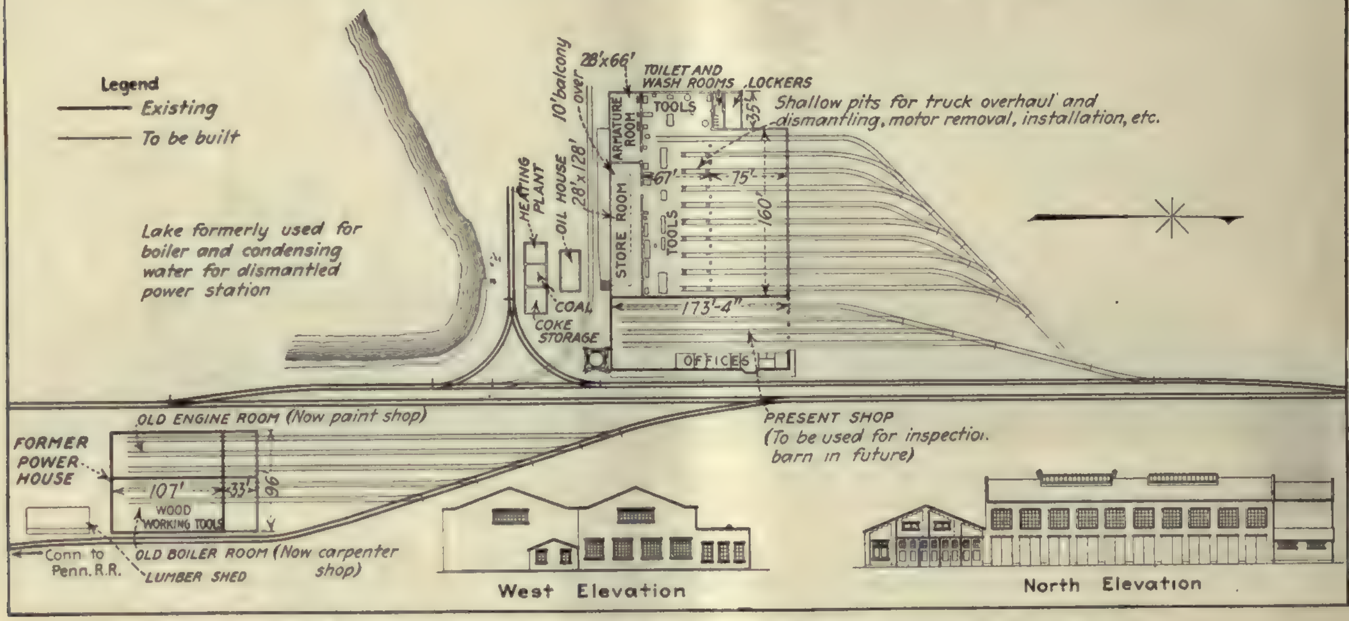
Having prepared itself with these facilities, the company, on Feb. 17, inaugurated an overnight freight service between any two points on the system. This resulted almost immediately in a pronounced increase in the tonnage offered to the company. Prior to this time all freight had been handled by local trains, making about forty-eight-hour deliveries. The regular freight schedule now includes the following:

INTERSTATE FREIGHT TRAIN SHOWING LOCOMOTIVE HAULING FOUR OF THE NEW STANDARD BOX CARS. THE OVERHEAD AND TRANSMISSION LINE CONSTRUCTION IS ALSO SHOWN

A through freight train from Louisville to Indianapolis leaves Louisville daily at 5 p.m. This runs local as far north as Columbus, Ind., and picks up freight at all stations for points north of Columbus. At Columbus a car is set off and the remainder of the train proceeds without stopping, except for making delivery, and arrives at Indianapolis about 8 a.m. The car set off at Columbus leaves there at 10:30 a.m. and runs to Indianapolis, serving local points intervening, in picking up northbound shipments. Southbound a local train leaves Indianapolis at 11:30 a.m. and runs as far south as Columbus, serving Greenwood, Edinburgh and other local stations, and pulling one trail car for Columbus and one for Seymour. A through train which leaves Indianapolis at 5 p.m. then picks up the Seymour car at Columbus, and usually a car from Columbus for Louisville, and frequently a third trail car for Louisville from either Indianapolis or some way station, and goes on through. A daily milk train is also run, leaving Columbus at 12:30 a.m. and proceeding to Indianapolis. On the return trip this train handles empty cans and local freight. In addition there are two local freight trains which operate between some of the smaller cities and way stations.

In 1920 the Interstate company handled more than 100 carloads of canned goods from one canning factory. It earned more than $60,000 gross revenue in hauling cement into Louisville from a plant about 15 miles out, one of the locomotives being kept busy on this work. A revenue of $6,000 was earned in hauling logs from Charleston and Scottsburg to Caruthersville. The Union Starch & Refining Company, at Edinburgh and the Bush Milling Company at Seymour were also heavy shippers over the electric line. Nearly $20,000 of revenue was earned from hauling milk. Arrangements have been completed with the small fruit growers for handling a very considerable quantity of strawberries and other berries from New Albany to Indianapolis, for which a rate of 70 cents a hundred is earned. Approximately 50 per cent of the freight business handled by the Interstate is made up of carload shipments.

Under the direction of Bert Weedon, general freight and passenger agent, a thorough canvass is continually made of the territory served in order to keep advised of any business available, to place the services of the company before the shipper and also to enable the company to plan in advance to handle it. Every local agent is expected to keep in touch with his territory, including the condition of crops from time to time, so that the transportation requirements may be estimated. In planning to handle the shipment of fruit, every farmer in the berry and melon territory was solicited and information secured as to the size of his crop and where he intended to ship, so that the company could plan to meet his requirements. At all times the closest cooperation between the transportation department and the traffic department is maintained and this has been a very important factor in the expansion of the freight business handled by the company. This applies equally well to the passenger business, for the company has been enjoying a very considerable revenue from special trains. The traffic department is not the only sales organization for the services of the company, for it is a frequent occurrence for the superintendent of transportation, L. M. Brown, to go out and contract for some special service, or send one of his assistants located at various points along the line to do so, when the representatives of the traffic department are engaged at other points on the 117-mile road.



Layout of New Shop to Be Built by the Interstate Public Service Company at Scottsburg, Ind.

For interstate business, the freight tariff of the Interstate company follows the same classifications and the same scale of rates as used by the competing steam lines. For intrastate traffic the rates are the same except that the electric line did not apply for the last 7 per cent increase in freight rates awarded to the steam roads. The competition which the Interstate company must meet is the Louisville Division of the Pennsylvania Railroad, which has a direct line running between Indianapolis and Louisville.

With increasing traffic and additional equipment to be maintained, the mechanical department has been somewhat handicapped in its work for lack of shop facilities. It has been unable to do any rebuilding of old equipment or much work other than strictly maintenance. In view of this, plans have been completed and work recently begun on a new shop at Scottsburg, Ind., a town of 1,200 population located 83 miles from Indianapolis and 34 miles from Louisville. At the present time small shops at Scottsburg, Columbus and Greenwood are in use, but the plan contemplates the centralization of all shop work at the new Scottsburg shop and utilization of the other shops for light inspection work and car storage, and likewise the present Scottsburg shop.

In an accompanying drawing the complete layout of the shop and track facilities at Scottsburg as planned by H. H. Buckman, master mechanic, may be seen. It will be noted that the main overhaul shop, machine shop, armature room, forge shop, store room, etc., are to be located in a building which is to be built as an extension to the present shop building. The offices of the master mechanic will remain where they are now in the present shop, although there will be a balcony office for the general foreman in the new building. The main overhauling shop will be served by ten tracks, whereby ten large cars may be simultaneously shopped. A row of pillars extending across the center of this space divides it into two portions which will be served by a 30-ton 75-ft. span cab-operated traveling crane and a 20-ton 67-ft. span floor-operated traveling crane

None of the tracks will have pits except for shallow ones at the inner ends of the tracks to aid the truck overhaul work. The scheme of handling overhaul will be to pick up the entire car body with the large crane, roll the trucks forward from underneath it, and lower the body onto horses or shop trucks. Any portion of the truck can then be picked up with the smaller crane and delivered to any machine in the entire shop, the runway of this crane extending from the wall of the present shop to the opposite end of the new building, 195 ft. The efficiency of this layout can be readily appreciated by a study of the accompanying floor plan showing the various machine locations. It was originally planned to build a new carpenter and paint shop to the south of and adjacent to the machine and overhaul shop already described. More recently, however, the Scottsburg power house belonging to the company was dismantled, and it was decided that with some remodeling this building, which is only a few hundred feet away from the present shop building, could be utilized for this purpose. A 33-ft. addition will be built on the front end and three tracks built in what was formerly the engine room and two in the old boiler room. The wall separating these two rooms will be left in place and will serve to separate the paint shop from the carpenter shop, permitting the maintenance of higher temperatures in the paint shop and keeping it free from the dust of the wood shop. The old boiler room will be filled in to bring the floor level of the carpenter shop up even with that in the engine room or paint shop. Various wood-working machines will be located in the carpenter shop as shown. A basement will be built under a portion of the carpenter shop and the heating plant for the building installed therein. The present coal bunkers used for receiving coal for the power plant will be used for storage of coal for shop uses. The track extending along the east side of the power plant runs over these bunkers on a trestle, so that coal may be unloaded from bottom dump cars, and connects to the south with the Pennsylvania Railroad, so that coal may be received direct in carload lots.

STANDARD INTERSTATE BOX CAR
View showing rounded end and tie bar connecting the side frames of the trucks.

The use of the old power house for a portion of the shop will involve a slight increase in the amount of shifting of equipment required in the various shop operations, but it will make a material saving in building construction costs, as well as obtain further use of the investment in the power-house building.

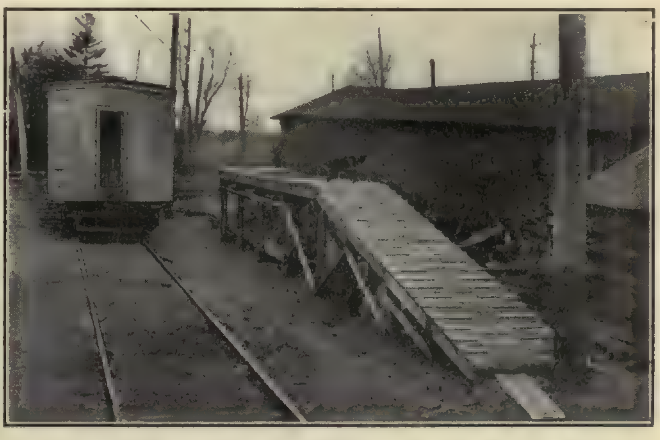
In maintaining the 108 passenger cars, fifty freight cars and nine service cars owned by the company the regular routine work calls for the shopping of 124 cars annually. As it is planned to do considerable rebuilding work in addition to this, the construction work on the new shop is being pushed to completion, the contract having been let about April 1.

Coincident with the improvements already mentioned, the company made important changes in its power system including the shutting down of two stations, the building of 54.6 miles of new 33,000-volt transmission lines and the rebuilding of 58.25 miles of existing transmission lines for higher voltage, the erection of six new substations and the re-equipment of others, etc. An account of this work was published in the issue of this paper for June 25.

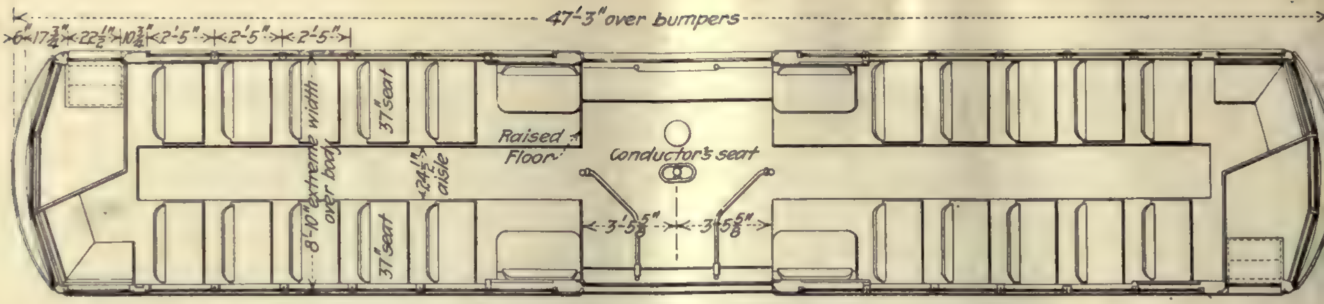
Question will quite naturally arise in the mind of any interurban operator as to how this extensive improvement program of the Interstate company was financed. This may be answered briefly by stating that it was done in good part through the activity of the company in selling its stock to its own customers. In order to purchase the new rolling stock, a subsidiary company known as the Interstate Car Trust Equipment Company was organized. Except for $50,000, the new cars were purchased entirely through the sale of the 6 per cent preferred stock of this company. This $50,000 represented the income from the sale of the common stock of the equipment company to the Interstate Public Service Company, for which the latter obtained the money through the sale of Interstate Public Service Company's 7 per cent prior lien preferred stock. The latter was sold along with about $200,000 more of the same stock to the public of Indiana. There was also a bond issue during 1920 of $400,000, which was backed up by additions to the plant account during the year amounting to over $800,000.

## Refuse Loading Platform Saves Labor

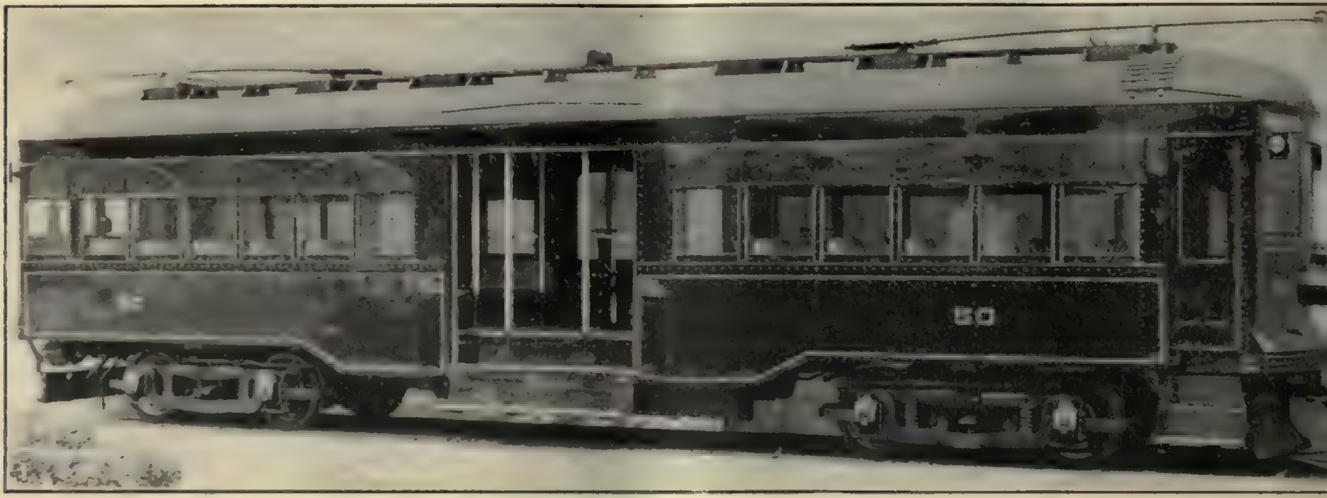
BY BUILDING a platform with an incline at one end and high enough so that a wheelbarrow may be dumped over the side of a gondola car considerable saving in labor has been made in connection with the disposal of refuse at the Wheaton, Ill., shops of the Aurora, Elgin & Chicago Railroad. Formerly the refuse was wheeled in a barrow and placed on the ground in the shop yard. It was then necessary to rehandle it to put it in the refuse car for disposal. By means of this platform this second handling is entirely dispensed with. The refuse car, which is a small single-truck car used entirely for this purpose, is spotted beside the platform and the refuse dumped in it as it accumulates. The gondola was away being dumped when the accompanying picture was taken.



PLATFORM BUILT TO AVOID REHANDLING OF REFUSE



FLOOR PLAN OF THE PHILADELPHIA & WEST CHESTER TRACTION COMPANY'S CAR



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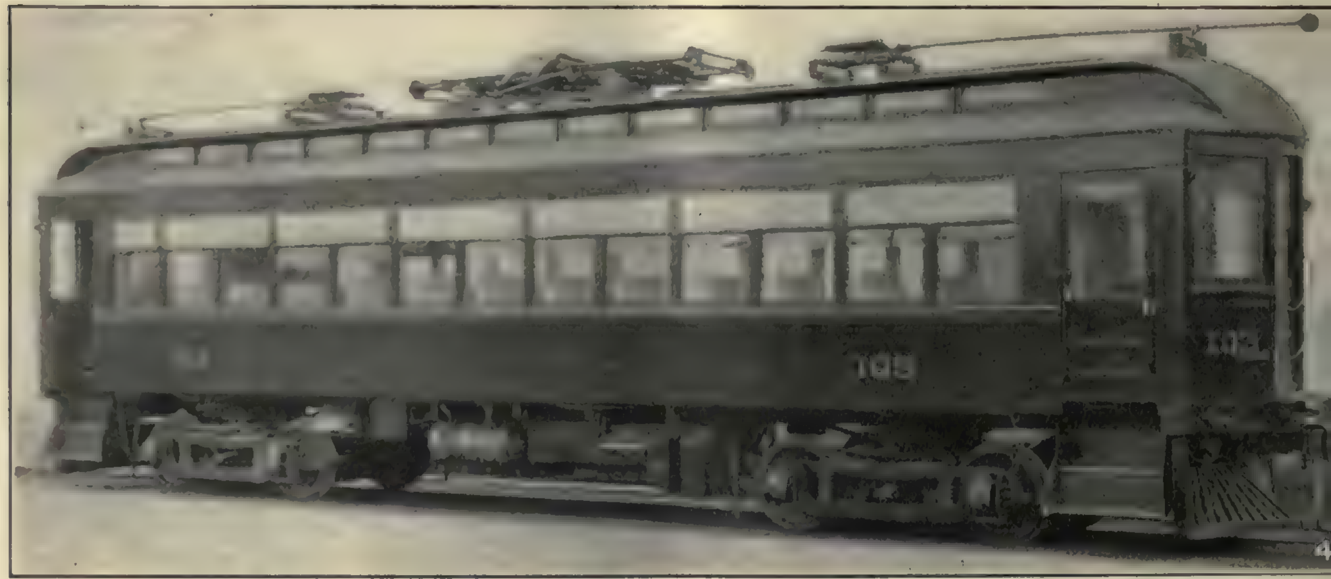

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No. 1—New Car for the Philadelphia & West Chester Traction Company.

No. 2—Interior View of the Philadelphia & West Chester Traction Company's New Car.

No. 3—Interior View of the Hershey Cuban Railway's Ne
Passenger Car.

No. 4—Latest Addition of the Passenger Equipment of t
Hershey Cuban Railway.

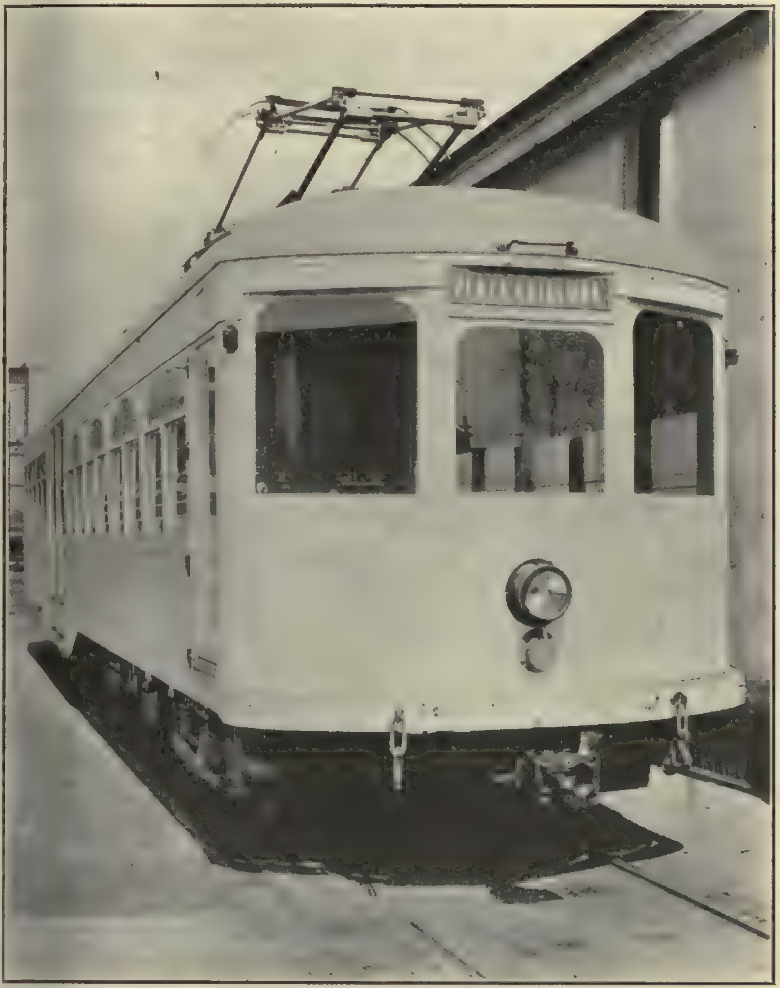
# Some Recent Interurban Car Designs

### While Very Few Interurban Cars Are Being Constructed at This Time, the Accompanying Information Regarding Four Types Recently Ordered Will Indicate the Trend of Practice in This Field

THE following facts regarding recent interurban cars relate to several types which have been built by the J. G. Brill Company. The data will be of interest in connection with the descriptions of the rapid-transit urban cars contained in articles in the June 11 issue.

Twelve all-steel, center-entrance motor cars were delivered to the Cataluna Tramways of Barcelona, Spain, last year. These have a central platform, which divides the car into two compartments, one for second-class and the other for third-class passengers. Partitions separate the second-class compartment from the central platform and from the other part of the car. There is no partition between the third-class compartment and the platform, but an arrangement of vertical and horizontal pipe railings is used to direct the incoming and outgoing passengers.

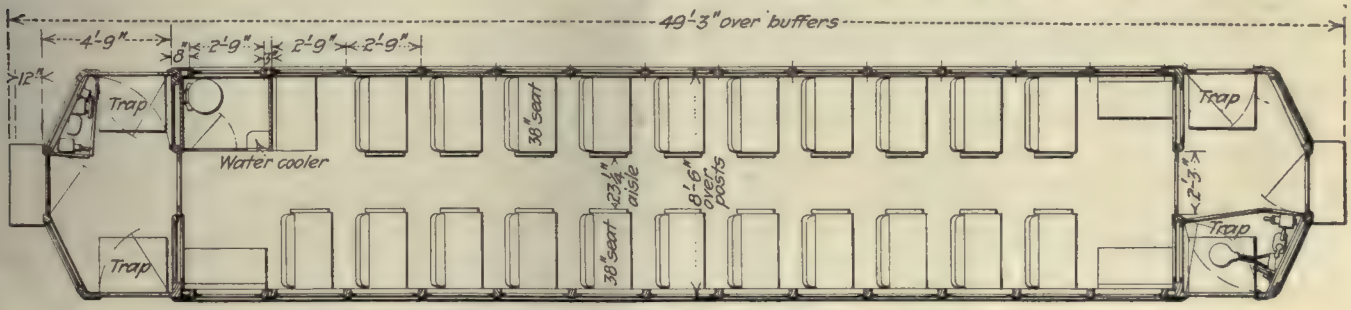
These cars are mounted on Brill 27-M. C. B. high-speed interurban trucks and the bodies are substantial. The underframing is of steel, with side sill angles 5 in. x 4 in. x ⅜ in., extending the full length of the car body without interruption at the central platform. Sub-side sills of 3½-in. x 3-in. x ⅜-in. angles extend from each side of the central platform to the end. There are two 5-in., 11½-lb. channel center sills and also crossings of 4-in., 5¼-lb. channels securely riveted and gusseted to the side-sill angles and channel center sills.



BARCELONA CAR—THREE SINGLE SASH IN THE VESTIBULES DROP INTO POCKETS

In the upper framing the main side posts between windows are of two 1½-in. x 2-in. x 3/16-in. tees, with inside and outside steel cover plates, while the intermediate posts between the two lower sash of each window are of 1½-in. x 2-in. x 3/16-in. strips encased in wood. The corner posts and the posts of the central platform are a combination of 1½-in. x 2-in. x 3/16-in. tees and an angle 2 in. x 1½ x ¼ in., with suitable steel cover plates. The sides are covered below the windows with 3/32-in. steel sheathing riveted to the underside of the angle side sill and also to the belt rail, side and corner posts. Attached to the top of each side post and supporting the plain arched type of roof are pressed steel U-shaped carlines, fitted with a wooden strip for the attachment of the roof boards.

The single upper sash of each double window is stationary and fitted with opalescent glass. The lower two sash are arranged to raise. In the end vestibule the sash drop into pockets behind the dasher. A motorman's cab is partitioned off at diagonal right corners of the car. These have swinging doors to the motorman's right, for entrance and exit, and another at his back, making the cab accessible from inside the car. As the side door is glazed in the upper panel, it is provided with a pantasote curtain. A stirrup-type step is installed below for the use of the motorman.



PLAN AND SEATING ARRANGEMENT OF THE HERSHEY CUBAN RAILWAY CAR

The side doors at the central platform for entrance and exit are manually operated by levers located at the conductor's position. Each door slides into a pocket next to the central platform post and is separately operated in conjunction with a sliding step. A feature of the door and step mechanism is that the doors cannot be opened until the sliding step is fully out, thus eliminating the possibility of step accidents. A single sliding door is located in the partition between the second-class compartment and the central platform, which separates this compartment from the rest of the car in a rather exclusive manner.

In the second-class compartment four reversible-back transverse seats on each side of the aisle and a semicircular seat against the front vestibule provide seating accommodations for twenty passengers. All reversible seats in this compartment are of the Brill "Winner" type, with spring cushions upholstered with rattan. The interior of the second-class compartment is furnished in mahogany. The third-class compartment is equipped with slat seats. There are five reversible-back Brill "Winner" type seats on each side of the aisle and a longitudinal seat for five passengers on each side next the central platform, together with a circular seat for four passengers against the vestibule. In all, this provides seating accommodations for thirty-four third-class passengers and gives a total seating capacity for the car of fifty-four. By the use of the longitudinal seats next the central platform in the third-class compartment the placing of vertical and horizontal pipe railings is permitted. This arrangement also provides additional standing space when traffic is heavy.

The ceilings are of agasote and below the windows hardwood sheathing is used painted to conform to the interior finish of each compartment. These cars are equipped for multiple-unit operation and have pantograph-type trolleys.

### Motor Cars for the Philadelphia & West Chester Traction Company

Ten cars of another center-entrance all-steel motor type were put into commission by the Philadelphia & West Chester Traction Company. The roofs of these cars are of the plain arch type, of ½-in. poplar roof boards covered with No. 8 canvas. The center entrance is provided with sliding doors of two sections, each sliding back into the body of the car. The doors, together with the single folding step, are operated by pneumatic mechanism controlled from the conductor's position on the center platform. The National Pneumatic Company's equipment is used for this purpose.

On each side of the center platform and on each side of the car there is a stationary longitudinal seat for two passengers. There is also a stationary seat for two persons against the vestibule window to the left of the motorman. A hinged longitudinal folding seat of cherry slats, when in use, extends across the doors on the closed side of the center platform. The reversible seats in the car body are also of the "Winner" type, upholstered in twill-woven rattan.

The side windows are fitted with double sash, the lower portions of which raise, and the upper sash, each extending across the width of two lower sash, are stationary. The three vestibule windows at each end drop into pockets and those in the center and at the right are provided with suitable sash racks which permit the sash to be held at various heights. The interior finish of the car is cherry, and the ceilings are of agasote, painted and decorated in accordance with the standard of the railway.

At diagonally opposite right-hand corners of the car body a motorman's cab is installed, entrance to which is made through a single swinging door to the motorman's left or the one to his right.

The underframe construction consists of angle side sills, 5 in. x 3½ in. x 5/16 in.; crossings of 4-in., 5¼-lb. channels securely gusseted to the side-sill angles and center stringers of 6-in., 10½-lb. channels. The side posts of the upper framing are of 1½-in. x 2-in. x 3/16-in. tees, extending from the side sill angles to the top rail and securely riveted to No. 14 pressed steel U-shaped carlines. Side sheathing and letterboards are 3/32-in. steel. Some of the principal dimensions are given in Table I.

TABLE I—DIMENSIONS AND WEIGHTS OF MOTOR CARS FOR PHILADELPHIA & WEST CHESTER TRACTION COMPANY

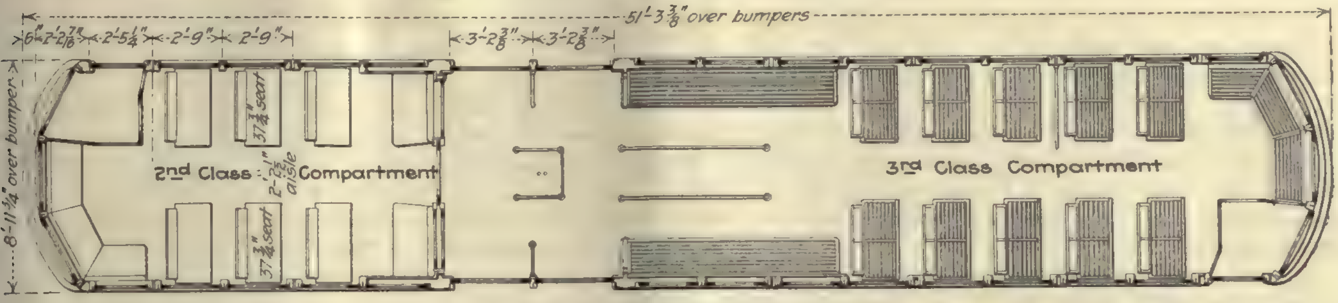
| | |
|---|---|
| Length of car body over vestibule | 46 ft. 3 in. |
| Length of center platform | 6 ft. 9 in. |
| Width of car body over post | 8 ft. 7 in. |
| Height from rail to top of floor | 3 ft. 8 in. |
| Height from top of floor over trolley pole | 8 ft. 9½ in. |
| Seating capacity | 57 |
| Weight complete | 57,160 lb. |
| Type of truck | Brill 27-M.C.B.-2X |
| Wheelbase | 6 ft. |
| Track gage | 5 ft. 2½ in. |
| Diameter of wheels | 33 in. |
| Journals | 4¼ in. x 8 in., M.C.B. |

### Equipment for Electrified Hershey Cuban Railway

Hershey Central, where the vast plantation of the well-known Hershey chocolate and cocoa interests is located, is situated in Havana Province, midway between Havana and Matanzas on the north coast of Cuba. For several years the surrounding district has been served by the Hershey Cuban Railway, a 35-mile steam line which is now in the process of electrification and extension. With the completion of the electrification of this line, it is intended to maintain the service between Havana and Matanzas, a distance of 56 miles, for the transportation of sugar, local freight and express, as well as a multiple-unit train service on an hourly headway schedule. Including all spurs, sidings and extensions this railway will have some 80 miles of track when the proposed extensions are completed.

Accompanying illustrations show the type of car to be used, ten of which were ordered from this company. The cars have steel underframes consisting of side sills with 4-in. x 4-in. x 5/16-in. angles the full length of the body, to which 3/16-in. steel side sheathing is fastened, extending from the under side of the side-sill angle to the belt rail. The center stringers consist of two 6-in., 10½-lb. channels extending from buffer to buffer. Crossings are of 4-in., 5¼-lb. channels which are securely gusseted to the side sill angles and the channel center stringers. The upper structure is principally of wood with body and vestibule posts of oak. Ash and yellow pine are used for the other members.

The closed vestibule on each end is constructed with two windows and a swing-type train door. The windows have double sash, the top sash being stationary and the lower sash arranged to drop. Sash racks are included to permit holding the drop vestibule sash at any desired distance. The upper sash of the swing train door is fitted with double sash, the top one of which is stationary and the lower arranged to drop. There is also a swing door on each side of the platform. A hinged trap door folds up against the end of the car body when this door is open. Triple steps are provided on each side of

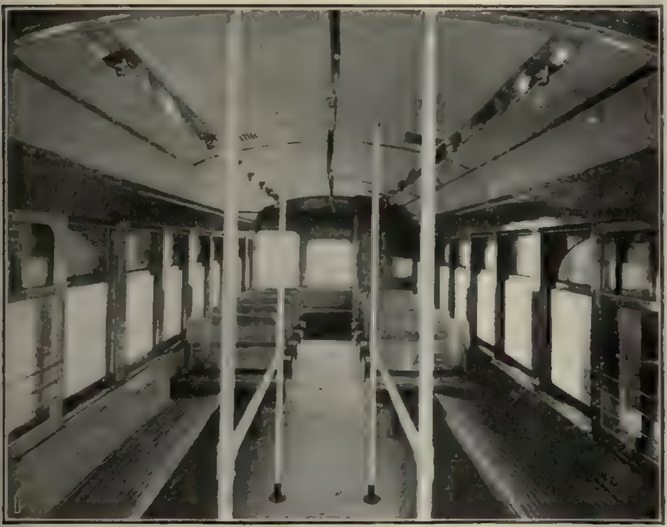


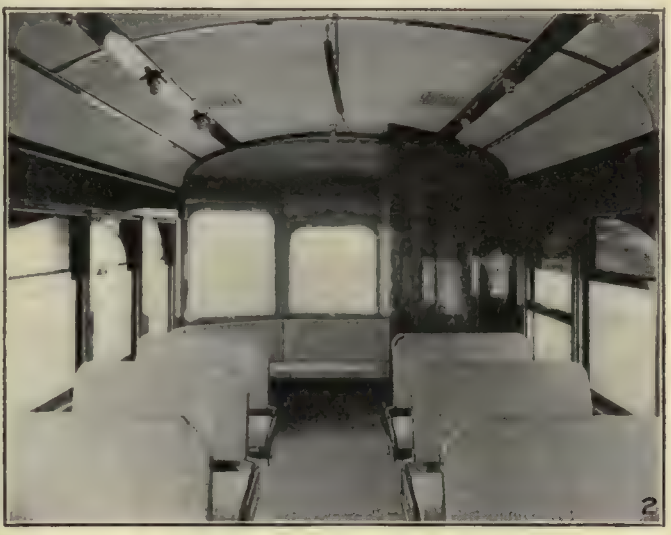
PLAN OF CAR FOR BARCELONA, SPAIN

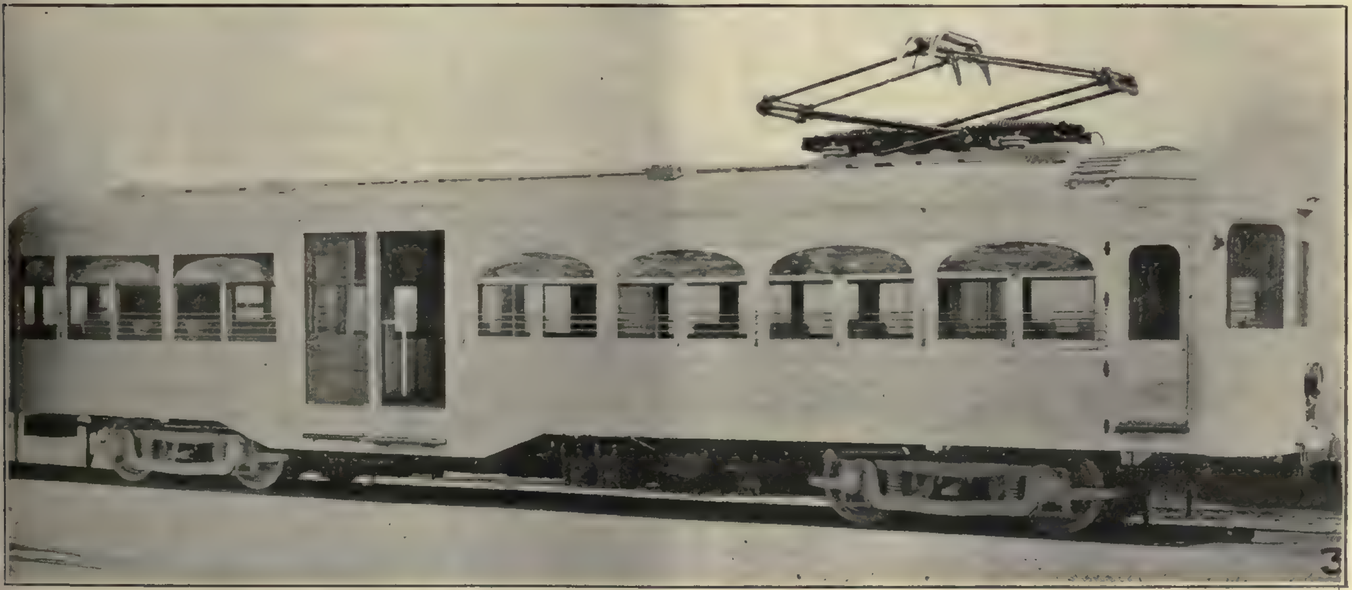
the platform. The height from the rail to the top of the first step is 14 in. and each of the other steps is 12 in. high. All vestibule sash and door channels are of mahogany. The top sash in the side windows are stationary and extend across the space of the two lower sash, which are arranged to raise. The upper side sash and ventilator sash are glazed with green opalescent glass.

The roof is of the monitor deck type extending over the hoods in steam coach style. The roof boards are of poplar and after being given a thick coat of paint, its entire length is covered with No. 8 canvas.

As will be noticed from the illustration, in addition to the two trolley poles and bases there is also mounted on the roof a pantograph type of trolley, and in order that the roof may properly support this equipment, it is strengthened with concealed steel rafters, which are so placed that they will relieve the strain of the trolley equipment. Inside the car body the floor is of the chanarched type, filled in with flexolith painted in red to conform to the appearance of the inside finish. Below the belt rail on each side, the car is sheathed with agasote. The ceilings are also of agasote. Mahogany is also used for the inside finish, which is quite plain, conforming to what is known as "sanitary finish." No advertising moldings are used in the construction.







NO. 1—THIRD-CLASS COMPARTMENT IN A BARCELONA CAR. NO. 2—SECOND-CLASS COMPARTMENT OF CENTER-ENTRANCE CAR FOR BARCELONA. NO. 3—ALL-STEEL CENTER-ENTRANCE MOTOR CAR FOR BARCELONA

A continuous iron basket rack is placed above the windows on each side of the car for the storage of miscellaneous packages which the passengers may have. The seats are of the reversible-back "Winner" type, including pressed steel pedestals, wall and aisle plates. The aisle plate is capped with mahogany arm rests. In each of the four corners of the car body there is a small longitudinal seat. All seats are upholstered with twill-woven rattan.

In one corner of the body is a saloon, next to which is an alcove for a water cooler. At diagonal corners on each platform a motorman's cab is partitioned off.

The trucks are of the Brill 27-M.C.B.-2X type with 6-ft. wheelbase and 6-ft. 3-in. side-frame centers. The trucks are constructed for standard-gage track. They are constructed with solid-forged side frames and are equipped with 4¼-in. x 8-in. journals of the M. C. B. type. The weight of the car and trucks complete is 64,280 lb.

### PHILADELPHIA & WESTERN CAR

A 56-ft. all-steel passenger car has been purchased by the Philadelphia & Western Railway. The roof is of the plain arched type and is constructed of yellow poplar securely bolted to the pressed steel carlines and covered with No. 8 cotton duck.

AT TOP, INTERIOR OF THE PHILADELPHIA & WESTERN RAILWAY'S NEW CAR. AT BOTTOM, PASSENGER AND SMOKING CAR OF THE PHILADELPHIA & WESTERN RAILWAY

The lower sash of the side windows are arranged to raise and are fitted with grooves with the "Renitent" all-metal post casings. The two windows in each vestibule have stationary sash. With the exception of the one in the center of each vestibule all doors are of the sliding type and are pneumatically operated. Steel bulkheads are placed on each side of the center platform and at each end of the car body. These bulkheads are co structed with suitable pockets to take the sliding door

The seats, of the reversible "Winner" type, a 40 in. long. Eighteen transverse seats upholstered twill-woven rattan are placed in the main passeng compartment and eight of the same type in the smoki compartment. These seats have arm rests of an inte urban and steam car design and are also equipped wi single automatic foot rests which move into positi with the reversing of the seat-back. Between the sea the aisle is 26¼ in. wide. On the center platform ba against the partition are four folding wood slat seat providing additional accommodations for eight person The seating capacity of t passenger compartment thirty-six, the smoking co partment sixteen, making total of sixty persons.

The interior finish, i cluding doors, molding etc., is of mahogany, a agasote is used for the i side lining below the wi dow sills and also for t ceilings. At the cente entrance door no steps a provided as the car is co structed so that the flo will come flush with the st tion platforms of the ra way company. This car is equipped with Westinghou A. M. M. air brakes and General Electric 263-A ty motors and control. The weight completely equipped 78,480 lb. Some of the principal dimensions of the c are given in Table II.

TABLE II—DIMENSIONS OF ALL-STEEL PASSENGER AND SMOKING MOTOR CAR FOR PHILADELPHIA & WESTERN RAILWAY

| | |
|---|---|
| Length of body over bumpers | 56 ft. |
| Length over corner posts | 44 ft. 8⅝ in. |
| Width of car body over posts | 10 ft. 8 in. |
| Height from rail to top of roof | 12 ft. 9½ in. |
| Height from rail to top of floor | 4 ft. 9½ in. |
| Truck centers | 31 ft. 3 in. |
| Post centers | 2 ft. 10 in. |
| Center door opening | 3 ft. 6½ in. |
| Type of truck | Brill 27-M.C.B.-3 |
| Wheelbase of truck | 6 ft. 6 in. |
| Diameter of rolled steel wheels | 34 in. |
| Journals | 5 x 9 in. M.C.B. |

## Protecting Eyes of Electric Welders

A DEVICE developed by an employee of the Mark Street Railway of San Francisco affords pr tection for the eyes of an electric welder without t use of the usual metal head dress. It consists of board slotted near one end for the insertion of color glasses which are held in place by a clamp. The oper tor holds the board in the proper position with h left hand, while his right hand manipulates the wel ing tool. In locations where an assistant would othe wise be required, with this device a single operat can safely carry on the welding operation because has an unobstructed view in all directions. The boa hangs from a strap around the operator's neck.

# Introducing Economies in the Paint Shop

### Cost of Painting Freight Cars Cut in Two by Use of a Painting Machine and a Saving of 40 per Cent Obtained in Cost of Painting Passenger Cars Through Simplifying the Method and Reducing the Labor Necessary

By W. G. Murrin
Assistant General Manager British Columbia Electric Railway, Vancouver

THE use of efficient methods in the paint shop speeds up work and yields economies that are most essential in these times of high prices. The experience of the British Columbia Electric Railway and the methods by which the costs of painting equipment were cut in half should prove interesting to those responsible for this work on other systems.

On the mainland division of the property, comprising 144 miles of city and 158 miles of interurban tracks, the mechanical department has the care of 250 city cars, seventy-three interurban passenger and express cars, thirteen locomotives, more than 400 standard freight cars and a number of service and construction units, making altogether 805 cars. These cars are maintained in four carhouses and one freight repair yard, with the general shops located in the carhouse at Prior Street, Vancouver. Painting is done to freight equipment at the "rep. track," in New Westminster, which is the center of the interurban systems, and to all other equipment in the paint shops at Vancouver, which have a capacity of six cars.

## COST OF PAINTING PASSENGER EQUIPMENT DECREASED 50 PER CENT

Up to the middle of 1915, when the effects of the great war, combined with the peak of the jitney craze, brought the railway revenue down to the lowest point in the last ten years, passenger cars were painted about every two years, the whole car being repainted, as outlined in the schedule below. The need for stringent economy led the master mechanic and paint shop force to study the work more closely, as a result of which they developed a method of treating the cars which practically cut the cost of ordinary periodical painting in two. It was found that while cars require revarnishing comparatively often, the groundwork remains in good condition for about ten years, and so, until the varnish begins to show signs of peeling off, it can be used as a ground and need not be entirely removed at each time of painting.

Since the method was changed, six consecutive wage increases have brought the cost back to what it was under the old method, but in view of this the actual saving is the more noticeable. The old method used for passenger cars with city equipment was as follows: (1) Washing; (2) varnish removed where necessary; (3) sandpapering, puttying up nail holes, joints, etc., where repairs had been made and priming over new work; (4) two coats of body color; (5) lettering and striping put on; (6) two coats of varnish; (7) painting trucks, ironwork, etc. The average cost of this work per city car was about $28 for material and $46 for labor, making a total of $74. In some cases the cost reached $85 or more. Interurban cars were proportionately higher.

The method was simplified in the revision as follows: After washing, the body is sandpapered where necessary, such as around repairs, over scratches or where the varnish shows cracks; new work is primed. The light color is given one coat and the dark color touched up where necessary to an even base for the next coat, with one coat over new work. Then, after retouching of the gold-leaf work where required, one full coat of dark color is applied, with "cutting in" around the lettering and striping with a fine brush. Then follow the usual coats of rubbing and finishing varnish. The cost of this method averaged at first about $16 for material and $28 for labor, a total of $44. The interior painting was not materially altered, except to substitute paint for varnish in some places, particularly where the original natural finish was becoming discolored from age or the action of the weather.

SPRAY MACHINE USED FOR PAINTING CARS AT VANCOUVER

The color standards for city equipment are: Red roof; dark green on fascia, corner posts, dash, sides below belt rail and vestibule ceilings; light corn color for window posts; light red on sash, doors, vestibule wainscots, trussplanks, etc., and seat frames; drop black on moldings, and black asphaltum for trucks and ironwork.

For interurban cars, the corn color is replaced with dark green, with a little striping of vermilion on moldings. Locomotives have Pullman green, with yellow lettering instead of gold leaf.

To show the effect of rising labor rates, the following comparison is interesting:

AVERAGE COST OF PAINTING CITY CARS

| Year | Material | Labor | Total |
|---|---|---|---|
| 1915-16 | $16.65 | $26.10 | $42.75 |
| 1916-17 | 14.70 | 30.75 | 45.45 |
| 1917-18 | 15.00 | 32.60 | 47.60 |
| 1918-19 | 15.65 | 35.25 | 50.90 |
| 1919-20 | 20.00 | 42.25 | 62.25 |
| 1920-21 | 20.30 | 53.60 | 73.90 |

Had the old method been still in use the last figure would have been about $125 per car. The saving, therefore, has been more than 40 per cent.

As most of the freight equipment was purchased in 1912 and 1913, repainting on an extensive scale was not begun till early in 1919. In July of that year a Dunn type-AA painting machine was purchased, with a capacity of 10 gal. The saving effected by this machine was such that it was paid for before twelve box cars had been completed.

### FREIGHT EQUIPMENT PAINTED WITH MACHINE AT LESS THAN HALF THE COST

To paint and letter a 40-ft. box car by ordinary means required eight to twelve hours for lettering and about thirty-six hours for painting, practically all of this work being done by a first-class freight-car painter. The average cost for material was $18.50 and labor $27, a total of $45.50 per car. The standard color is green, with lettering in white lead put on with stencils. About 6 gal. of mixed green, 1 gal. of red roof paint and one-half pint of white lead were used to a car.

After a few cars had been done with the machine and the men had acquired experience in operating it, it was found that better work was being done with a gallon and a half less paint per car. The average time for applying the green paint on all four sides was about two hours; one hour was plenty for the roof, and the time for lettering was about eight hours. The machine does not require a regular painter and can be operated by a brush hand. The actual cost of the first twenty-four box cars done with the machine was $14.55 for material and $6.80 for labor, a total of $21.35 per car. The saving is therefore about 51 per cent.

The accompanying photograph shows the machine in operation, and an idea of the rapidity with which the work is done can be obtained from the fact that while the photographer was changing plates and taking three exposures the end and portion of the side shown was sprayed. The paint is laid on in two coats, the amount to a coat being determined by the distance from the surface at which the nozzle is held. Rough spots, cracks, nail holes, etc., are penetrated more thoroughly than can be done with the brush, and the finish is all that could be desired. At first some difficulty was found from the spray being carried by air currents, till all the surrounding "scenery" was being painted, as well as the operator, but experience has enabled the reduction of this trouble to a negligible amount. As already stated, the actual amount of paint used is less than with the brush. A flat car will require about ½ gal. of paint and a quarter of a pint of lead. One hour is required with the machine and four and a half hours for stenciling, the total cost being about $8.

The machine is operated by compressed air at 60 lb. pressure, supplied from a pipe line through a feed valve, with outlets convenient to the painting track. In order to avoid clogging of valves and atomizer it is better to clean out the machine after using, so the work is arranged so as to keep the machine in operation all day, a sufficient number of cars being done at a time, thus reducing the extra labor for cleaning the machine to a minimum per car.

The success attained in painting cars has suggested the use of the machine for painting shelters and other structures along the right-of-way, such as telephone booths. This will probably be tried during the present summer.

# Electrification at Edinburgh

### Gasoline Motor Buses and Electric Railway Cars Replace Cable Operation—The Choice Was Determined by Traffic, Power and Price Conditions

THE ELECTRIC RAILWAY JOURNAL of Oct. 2, 1920, contained some interesting comparisons of electric car and gasoline motor bus costs presented by R. S. Pilcher, tramways manager Edinburgh Corporation Tramways. The Edinburgh problem is that of superseding the cable system by a combination of electric railway and motor bus routes which will give the city the most effective transportation at lowest over-all cost. The installation of buses was begun in 1919 on some of the northern cable routes, where the track was in the worst condition. In a report made to the Municipal Council on April 2, 1921, Mr. Pilcher goes into detail concerning future work. This report is abstracted herewith.

### CARHOUSE, SHOP, LINE AND TRACK ESTIMATES

Mr. Pilcher first explains what has been done in the way of installing electric cars and buses, and to care for the electric cars he recommends a forty-car addition to the Leith carhouse at a cost of £23,953 (about $96,000 at $4 to the pound) and alterations at the Shrubhill shops for the pit accommodation, etc., of thirty cars at a cost of £9,466 (about $37,900).

SAMPLE REBUILT DOUBLE-DECK CAR, SHOWING VESTIBULING AND OPEN PORTIONS OF UPPER DECK

For all of the first section, except Leith Walk, span construction, including the use of rosettes, is recommended. The width, 69 ft., of Leith Walk, however, suggests the use of center-pole construction in harmony with the construction already in use on the absorbed Leith Tramways. These poles would be used also for lighting fixtures, the existing lighting standards being replaced. The estimated cost of 4.3 miles overhead line, including section boxes, is placed at £19,989 ($80,000).

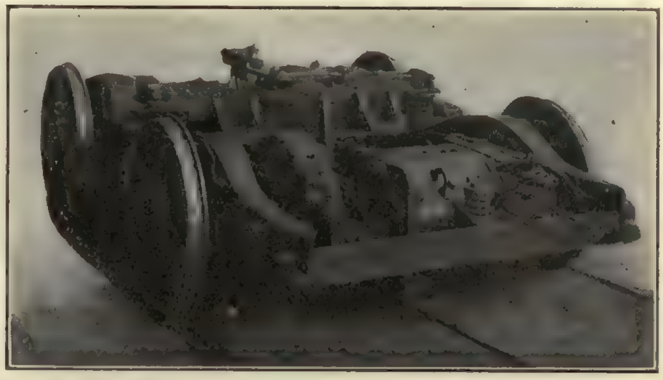
Although the rails on this section weigh only 83 lb. per yard, while the latest British practice calls for 105 lb. and more, Mr. Pilcher recommends their retention, provided the rail joints are in good condition, and that these joints be bonded and welded. The cost of this work for 3.4 miles of route is placed at £1,600 ($6,400) a mile. It is noted that the use of the Dicker electric weld on 1,550 yd. of track on this route was very successful, despite the worn condition of the rails, and that the cost of entirely renewing the track would be £27,000 ($108,000) per mile of route.

In view of the fact that the penny or short-haul riders of Edinburgh constitute 25 per cent of the traffic, it is not desirable, says Mr. Pilcher, to have a double-deck car seating more than sixty passengers and over 31 ft. long, as a larger car would have too many stops to permit a satisfactory rate of speed. For suburban traffic, a larger car can be considered when the time comes. Because of the climatic conditions, the upper decks of all cars should be covered, but open seats for four passengers could be left at each end. The ventilator windows should be arranged to open horizontally instead of vertically to insure better ventilation. Not only would Mr. Pilcher finish the lower saloon in teak but he also suggests the rather novel (in Great Britain) installation of upholstered cushions and back rests of leather or leather substitute, the usual practice being along less comfortable lines.

Another departure from current practice would be the spacious platforms—these being 6 ft. 1 in. long—inclosed vestibules and front exits with folding gates and steps operated by the motorman. These front exits are intended only for use at terminals and busy stopping places.

The bodies would be mounted on single trucks of long wheelbase, the journal boxes being fitted with links to give a certain amount of play to the axle when rounding curves. Two trucks of this type and with a 7 ft. 6 in. wheelbase are already in use on the Leith electric lines. Two distinct brakes are suggested: (1) Ordinary hand wheelbrake with Ackley attachment; (2) magnetic track brake operated from car motors acting as generators. An additional power track brake would be used in later operation of steeper lines.

### REBUILT DOUBLE-DECK, DOUBLE-TRUCK CARS WILL ALSO BE USED


PRESSED STEEL WELDED MOTOR TRUCK WITH INTERPOLE MOTORS FOR EDINBURGH CARS

Where possible, Mr. Pilcher recommends the reconstruction of top-cover cable cars at a cost of about £300 ($1,200) each to the style illustrated. These cars also happen to be exceptionally light. A trial has already been made of refitting the existing cable trucks for electric traction. The wheels have been increased from 22 in. to 24 in. diameter, stronger axles have been installed, the spring suspension has been altered and the journals have been equipped with roller bearings. The cars have been equipped with two 27-hp. interpole, self-ventilated motors. The illustration on page 12 shows this car.

The electrical and mechanical equipment of this sample car weighs only 7,668 lb. compared with 13,492 lb. for that of the like equipment on an electric car of the Slateford route. The sample car complete weighs 18,928 lb., which is 5,216 lb. less than the single-truck electric cars on the Leith Lines. The motors used are stated to be of the safety car type. Tests of the sample car show a maximum running speed of 17.5 m.p.h. when operating on the level and 11.5 m.p.h. on a 5 per cent grade.

To operate the first section forty-seven cars will be required. Mr. Pilcher suggests that bids be asked for

EDINBURGH CORPORATION MOTOR BUS CLIMBING THE MOUND, THE FIRST CABLE ROUTE IN EDINBURGH TO BE ABANDONED. SCOTT MONUMENT AND PRINCESS STREET IN THE BACKGROUND

sixteen new cars and that thirty-one of the existing cable cars be converted. The cost is estimated as follows:

| | |
|---|---|
| 16 car bodies at £1,500 each | £24,000 ($96,000) |
| 31 cable cars with new top covers, to be converted, £300 each | 9,300 ($ 37,200) |
| 45 electrical and mechanical equipments at £1,400 each | 63,000 ($252,000) |
| | £96,300 ($385,200) |

The third item includes new trucks for sixteen cars and altered trucks for thirty-one cars.

On certain other routes the motor bus is considered more suitable so long as the present prohibitive prices of track continue. In conclusion, Mr. Pilcher summarizes the chief reasons why electrification should be proceeded with as soon as sufficient power is available, namely, greater reliability of service, through running to the neighboring city of Leith and lower over-all cost than the cable system, despite additional capital requirements.

## Germany Sticks to Single Phase

### Federal Railway Administration Has Never, Even Temporarily, Considered Any Other System—Sweden Is Extending Its Single Phase Lines

According to the *Deutsche Allgemeine Zeitung* for May 14, the German Federal Railway Administration has denied that it is considering any system other than the single-phase for its railway electrification. Commenting on a contributed article in the issue of this paper for March 5 in a statement which is reported to be official, the *Zeitung* says, in part: "The German Federal Railway Administration has always considered the single-phase system as the only one possible for its main lines and has never, not even temporarily, considered any other. A similar stand was taken previously by the individual state administrations. All existing federal main lines are a.-c. operated, and only this system will be used for any new lines. Hence, any international congress is not necessary. Last February there was a meeting of representatives of the federal lines and those of private lines, but its only purpose was to solve the question of current supply."

Sweden is also extending its single-phase lines. According to F. Overholm, chief electrical engineer, Swedish State Railways, there were in Sweden in May of this year 260 miles of electrified railroads, of which 240 were single phase and 20 were direct current, and the extensions during the remainder of this year, all single phase, will amount to 140 miles.

## New High-Voltage Line in Arkansas

The Arkansas Light & Power Company of Pine Bluff has started work on the construction of a 33,000-volt line from its substation at Stuttgart to the substation of the Arkansas Utility Company at Clarendon, a distance of 20 miles. The line will cost $60,000 and is being built by William Crooks, engineer and contractor. No. 0000 steel aluminum strand will be used with R. Thomas & Sons No. 3,058 insulators and Moloney transformers. White cedar poles are to be used, except where the line crosses the White River. The 1,000-ft. span across this stream will be suspended from two 90-ft. steel towers. It is expected that the work will be completed by July 15. The Arkansas Utility Company will distribute the electricity at Clarendon, Brinkley and Cotton Plant. The Arkansas Light & Power Company will generate the electricity at its plants at Pine Bluff and Picron, from which lines extend to other communities. The Arkansas Light & Power Company also operates stations at Russellville.

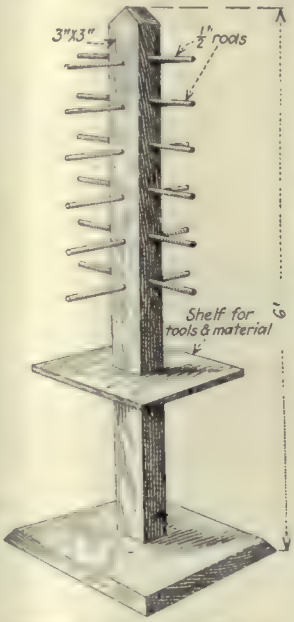
## Using Lye to Remove Old Insulation

### In Reinsulating and Repairing Old-Type Field Coils an Indiana Railway Facilitates the Removal of Old Insulation and Tearing Down Coils By Use of Lye

By J. E. Hester

Master Mechanic Union Traction Company of Indiana, Anderson, Ind.

The Union Traction Company of Indiana has twenty quadruple equipments of Westinghouse No. 85 motors in service. This type of motor has wire-wound field coils and, due to insulation breakdowns, it has been found necessary to tear them down and reinsulate them a number of times during the twenty years of their active service. In this work soaking the field coils in a strong solution of lye for several days has been found to loosen the old baked insulation, which can then be readily removed. After the insulation has been taken off the wires, the coils are allowed to dry and are again reinsulated by hand, with the aid of a type of rack shown in the accompanying illustration. The work of reinsulating the coils is necessarily done by hand and a laborer can insulate two of these coils a day.

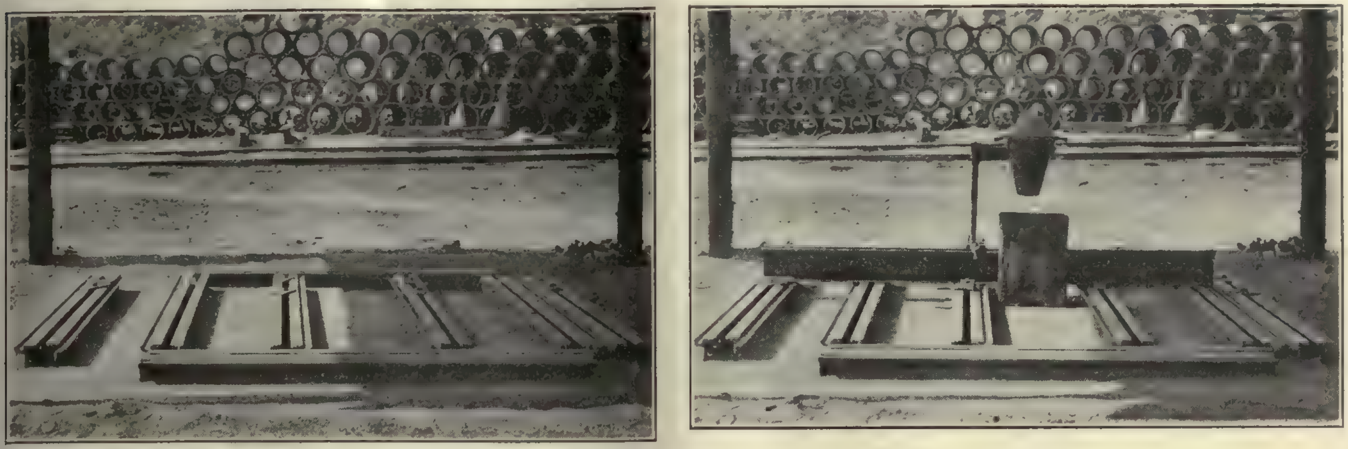


Vertical Rack for Use in Reinsulating Field Coils

In re-forming the coils the wire is first given a coat of linen tape and the wires are then reassembled by hand in as nearly their original shape as possible, after which a coat of cotton tape is applied. The coils are then dipped and baked, after which they are put into a forming press to restore them to their original shape.

The forming press is a homemade affair, constructed of second-hand material found on the property. The base consists of a 20-in., 70-lb. steel I-beam, to one end of which an air cylinder is fastened. To operate this press it was necessary to have a piston travel of 23½ in., and in order to obtain this long travel two 12-in. air-brake cylinders were welded together. The form used for reshaping the coils is made of cast iron and bolted to the opposite end of the I-beam. It is connected to the air cylinder by the 1-in. x 6-in. pressure bar with a ratio of 2 to 1. Air for operating the mechanism is secured from a convenient air-testing bench, and a pressure of 100 lb. per square inch is used.

After the coils have been properly formed they are again put in the baking oven and given another baking, as the previous baking was only preliminary and the coils were but partly baked. After this final baking, additional insulation is applied and the leads are soldered in place. By this method it is found that the coils are restored to their original condition for a very small cost as compared with that of new coils.



TWO VIEWS SHOWING ACTUAL APPEARANCE OF ATLANTA'S THERMIT WELD PLATFORM

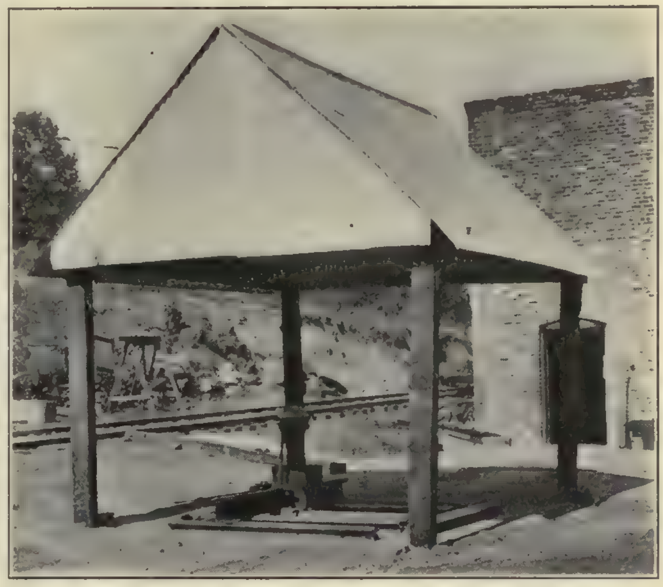
# Building Frogs in Atlanta

### Experience Shows that a Good Welding Platform Is Most Essential to Insure the Careful Alignment of Parts

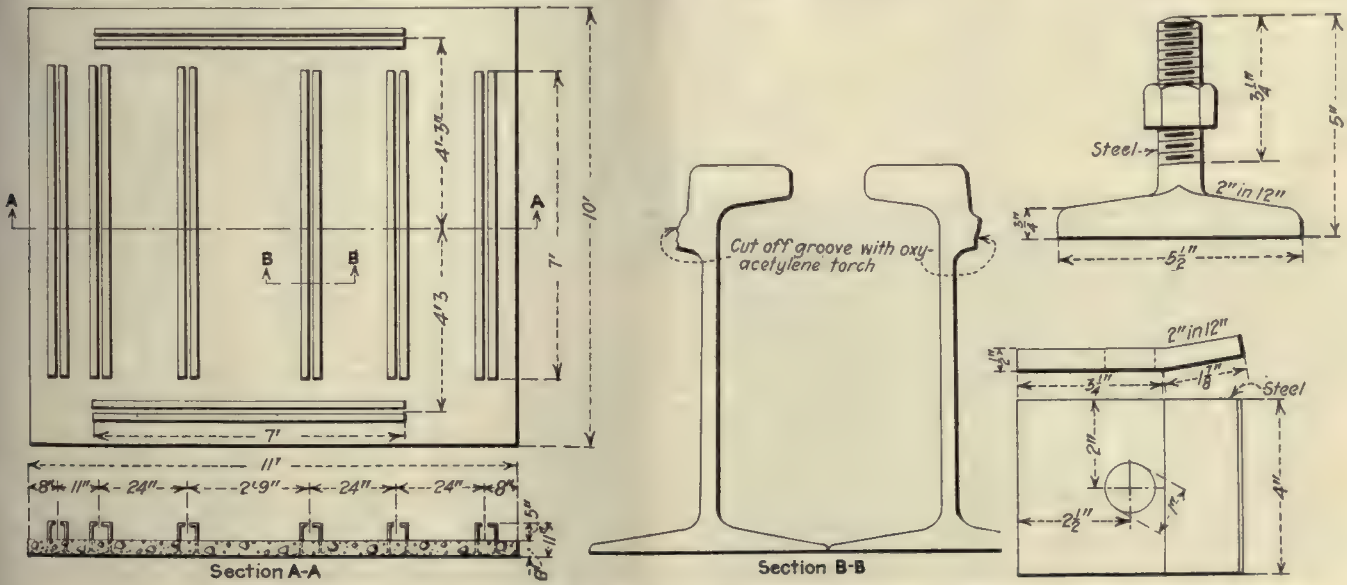
FOR more than a year now the Georgia Railway & Power Company, Atlanta, Ga., has been building crossovers and frogs by the Thermit process in cases where one or two frogs have gone to pieces in a crossing the rest of which is apparently good for several years. The company reports that there has been uniform satisfaction in this work. Records indicate that, in the case of the welding of frogs, the cost has been about one-third of the cost of a new frog ordered especially to take the place of the one which had given out.

The first requirement, however, to make good frogs is that there shall be a good platform upon which to build them, so that the various parts which are to be welded together will be aligned accurately and held in place rigidly while the welding is being done. Accordingly, the ways and structures department, under the direction of C. A. Smith, superintendent of roadway, has constructed a special platform, housed under a roof, for this purpose. An accompanying drawing indicates the details of this platform, with the type of clamp used also shown. It is seen that this is constructed by the use of old rails imbedded in concrete and the platform gives excellent satisfaction. Accompanying photographs show the platform installed and a rail on it ready for welding.

Another illustration shows the entire installation with the roofing for protection against weather.



ENTIRE WELDING INSTALLATION WITH ROOFING FOR PROTECTION AGAINST WEATHER



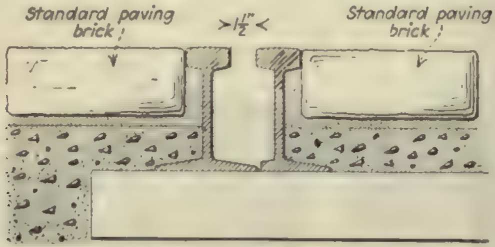
DETAILS OF THERMIT WELD PLATFORM CONSTRUCTED OF RAIL AND CONCRETE IN ATLANTA

New Brick Crossing in Little Rock

## Maintaining Brick Crossings

IN MANY cities brick paving is used between the car tracks, and where this kind of paving is used with T-rails and the track is crossed by heavy vehicular traffic the usual result is a wearing away of the bricks next to the rail until such a state is reached that automobilists swear at the street railway company. If the pavement is maintained satisfactorily, the cost is exceedingly high.

In Little Rock, Ark., this trouble has been an ever-present annoyance to the railway management, but a satisfactory scheme has now been devised so that in the future such crossings, when once repaired, will stay that way.



Old T-Rail with One Flange Cut Off, Installed as Protection on Brick Crossing

Old lengths of T-rail have had one flange cut off by an oxyacetylene torch, so that they may be set in the pavement on the ties with a 1½-in. spacing between the edges of the wheel rail and the guard rail thus installed, leaving this 1½ in. as a flangeway. An accompanying sketch shows the relative arrangement of the two rails. Standard brick is then laid directly against this inside guard rail as well as the outside rail, so that the finished crossing is absolutely level and smooth except for the 1½-in. flangeway space which remains. This provides a very satisfactory crossing for vehicular traffic, a the one installation which has so far been made Little Rock indicates no tendency toward deteriorati at all.

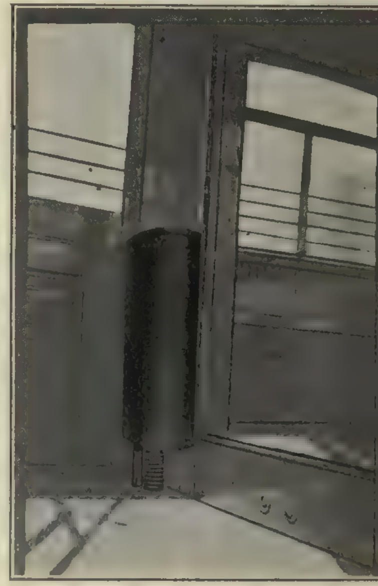
Old Brick Crossing Which Jarred Vehicular Traffic

The change has been so noticeable that there ha been many freely offered commendations of the railw company for its efforts in this direction.

Accompanying photographs show the typical crossi before treatment and the crossing which has been bu as described herewith.

## Effective Air Sander

PARTLY, at least, as a result of the recommendatio of its safety committee, the Chattanooga Railway Light Company has been equipping its cars with a sanders. In arriving at a decision as to the type sanders to use the company paid particular atte tion to a study of how to keep the sand always dr Previous experience had indicated that sand box under the car or under the front seat and resting the floor were very apt to have the sand in them made wet by water thrown off by the wheels. The accompanying illustration shows the sand box finally decided upon and now being installed upon the cars of this company. This sand box is metal, shaped very much like a controller box, and is mounted about 5 in. or 6 in. above the floor of the platform. The usual air pipe leads to the box at the bottom and a flexible coiled wire sand pipe about 2 in. in diameter carries the sand to the point in front of one wheel where it is desired. Experienc so far with this installation has proved that the sand always dry, and the company is satisfied with th installation. In some cases there has not been enoug room to place the sand box on the rear or bulkhead sid of the platform and it has been necessary to mount it the left of the controller. This necessitates, of course, much longer sand pipe from the box to the discharg point above the rail, in some cases making a pipe as lon as 4 ft. or 5 ft., but this apparently has not diminishe the effectiveness of sand delivery as needed.



New Type Sand Box Installed at Chattanooga

The May issue of the *Monthly Labor Review*, pu lished by the United States Department of Labor, devoted very largely to the publication of statistics wages and hours of labor in the different industrie among them the steam railroad industry and the ele tric railway industry. The steam railroad statistics a based on figures compiled by the Interstate Commerc Commission and the Bureau of Railway Economic The electric railway figures show wages paid on number of properties on Dec. 31, 1920, and are fro the *Motorman and Conductor*.

# Pennsylvania Association at the State Capital

### Pertinent Addresses Were Presented by Philip H. Gadsden; W. D. B. Ainey, Chairman, and Dr. F. H. Snow, Engineering Department of the State Commission; T. L. Montgomery, State Librarian, and D. N. Casey, Field Director State Chamber of Commerce — President T. B. Donnelly Re-elected

THE Pennsylvania Street Railway Association held its annual meeting on June 16 and 17 at the Penn-Harris Hotel, Harrisburg. The topics considered included an address by Philip H. Gadsden, president American Electric Railway Association, and papers covering personnel work, public relations, one-man cars, street railway history, helical gearing, automobile hazards and snow removal.

In his opening remarks President T. B. Donnelly, claim agent West Penn Railways, pointed out the complication of electric railway operation imposed by the automobile from the standpoints both of competition and accident hazard. He also paid a tribute to the association for the service rendered to its members in assisting them in solving their common problems.

### PHILIP H. GADSDEN SPEAKS

Mr. Donnelly then introduced P. H. Gadsden, president American Electric Railway Association, who outlined the electric railway situation and suggested four remedies for present ills. First, he said, the real trouble is not inadequacy of rates, but lies deeper than that, although that is a factor. The "heavy hand of regulation" has been laid on the transportation and other utility business as on no other. Prices in other lines ran riot, and while high prices were secured in other industries the utilities languished financially. During the war electric railways, at a loss, carried highly paid workers to plants operating at a high profit. They should not be expected to sell their goods below cost.

The financial plight of the electric railways is due, in part, to the devotion of managers to giving good service to the neglect of the commercial and financial sides of the business, whereas in other activities executives give large attention to the selling end. Thus the 5-cent fare, inaugurated largely for historical reasons, was allowed to stand because the economics of transportation production did not receive proper attention. It was assumed that an unlimited quantity of the product could be sold at a fixed price, in defiance of economic laws. Obviously some kind of "metered service" must be furnished, such as is supplied under a zone-fare system.

From now on the commercial instinct and class consciousness must be developed, we must "go to some school of salesmanship." The industry has "arrived," it has become stabilized; the war taught that electric railway transportation is essential and lies at the basis of industry. Now electric railway credit must be re-established, not by individual properties but as a whole, because the investing public has lost confidence in this field for investment. This is made more difficult by the ease with which municipalities can issue tax-exempt securities, which to persons of large income are more attractive than any securities which can be put out by electric railways at much higher rates of interest.

The result of all this is that railways cannot make needed repairs. The public then becomes irritated with the resulting unsatisfactory service and is inclined to consider municipal ownership as the way out. Thus while political policies of government are opposed to such ownership, the fiscal policies favor it. As much municipal expenditure is for unproductive enterprises, if municipalities can borrow money for public use with tax-exempt securities, much of the country's capital will be deflected from utility as well as industrial enterprises.

Among things that can be done to restore electric railway credit the following may be mentioned:

1. The real value of the properties should be definitely and officially established.
2. A system of rate regulation should be established under which the rates shall be flexible and quickly responsive to changing conditions; presumably some kind of a service-at-cost system.
3. Closer fundamental relations between the railway management and the public and employees must be fostered.
4. Publicity, in the large sense, must be persistently used to cultivate a personal touch with the car rider. This will be assisted by the campaign to be launched on July 8 by the Committee of One Hundred of the American Electric Railway Association.

### PAPERS BY MESSRS. CASEY AND BOYCE READ

Daniel N. Casey, field director Pennsylvania State Chamber of Commerce, followed Mr. Gadsden with a paper on "The Street Railway and the Community." A paper prepared by W. H. Boyce on "Personnel Work" was then read by Secretary Henry M. Stine, in the author's absence. Both of these papers are abstracted elsewhere in this issue.

The reading of the above listed papers was followed by a brief general discussion, during which such points as the following were brought out: There is no one solution for all electric railway problems. For instance, the mere raising of rates of fare may defeat its own purpose by decreasing patronage. Obviously the purpose is to choose a rate commensurate with the service and with due regard to the convenience of the passenger in paying his fare. Improvement will be the reward of thorough analysis. Again, valuation procedure has yet to be put on a permanent basis to prevent a continual reappearance of the question. In the practical determination of value an element always considered is earning power, and this is inevitable. Great emphasis was laid on the fundamental necessity for getting capital from those to be benefited by the facilities for which it is to be spent. The future financing of extensions in particular should take this form. In many cases the assistance of municipal credit, which attracts money at lower interest rates, will have to be sought. This does not, however, involve municipal ownership. In addition a portion of the future financing of the railways must be drawn from earnings.

It was also suggested that many properties might benefit by a campaign of "cleaning your own house." For example, some railways may have cut service too far in their desire to meet expenses, and cases were mentioned where an increase in car-miles had brought more patronage.

### JITNEY PROBLEM TO BE STUDIED

At the close of the discussion on the morning session papers C. L. S. Tingley, vice-president American Railways, called attention to the importance of studying the jitney problem for the purpose of insuring operating conditions which are equitable to all concerned. He applied the well-known phrase "Eventually, why not now" to the burdens which the buses must ultimately carry and he pointed out that their situation is similar to that of the electric railways during their development period. People were then so glad to get street railway service that they imposed few burdens on this promising transportation system. Later, however, the burdens became increasingly serious. Such burdens the jitney business cannot continue to sidestep indefinitely.

On Mr. Tingley's motion a committee to study and report on this subject was authorized. President Donnelly, in due course, announced the following appointments: Mr. Tingley, Douglas Ford, superintendent North Branch Transit Company, and Thomas Newhall, president Philadelphia & Western Railway.

### FRIDAY MORNING SESSION

The first paper read at the morning session on June 17 had for its topic the one-man car. It was read by the author, C. D. Smith, superintendent Pennsylvania-Ohio Electric Company. The paper is abstracted elsewhere. This was followed by a talk by Dr. Thomas L. Montgomery, State Librarian of Pennsylvania, who, with the aid of lantern slides, traced the development of transportation from primitive times to the early days of the electric railway. His purpose was to furnish a historical background for an appreciation of modern transportation facilities.

The next speaker was C. K. McGunnegle, who read a paper entitled "Changes Necessitated in Operation Owing to the Automobile Hazard," written by M. T. Montgomery and himself, both of whom are assistants to the general manager of the Pittsburgh Railways. This paper is abstracted on another page.

The discussion on the above papers brought out the difficulty of comparing the maintenance costs of cars of different types and ages and the importance of standardizing on the parts of car equipment, track details, etc., especially those requiring frequent renewal. A digest of the discussion on the one-man cars, which was a feature of the Lake George convention of the New York Electric Railway Convention, held during the preceding week, was also given.

The final paper read was by W. H. Phillips, manager engineering department, R. D. Nuttall Company, on helical gearing. This was of a technical character and special lantern slides were shown to illustrate the characteristics and action of different types of gear teeth. An abstract of this paper also appears in this issue.

On motion of the nominating committee the following were re-elected to serve for the coming year: President, T. B. Donnelly, West Penn Railways; vice-president, C. B. Fairchild, Jr., Philadelphia Rapid Transit Company; secretary and treasurer, Henry M. Stine, Harrisburg, Pa.; members of executive committee, C. L. S. Tingley, American Railways; Gordon Campbell, York Railways; F. B. Musser, Harrisburg Railways; Thomas Cooper, Westinghouse Electric & Manufacturing Company.

A committee of manufacturer members was also appointed to enlarge the membership among supply men. The secretary was also instructed to send the greetings of the association to F. B. Musser, president Harrisburg Railways, who was in Edinburgh, Scotland, at the time of the meeting.

### NOTABLE SPEAKERS AT BANQUET

The annual dinner of the association was held at the Penn-Harris on Thursday evening, with Mr. Tingley as toastmaster. He first called upon C. B. McCahill, president Pittsburgh, Harmony, Butler & New Castle Railway, to tell of the profit-sharing plan in operation on the latter's two properties operating in the Pittsburgh region. Mr. McCahill explained that a fourth of the companies' common stock is lodged with a trust company in a trust fund, the dividends being divided among the employees who have been a year or more in the railway service. Three out of seven of the directors of each of the companies are elected annually by the employees, and they have proved helpful in suggestions and in spreading the facts regarding operation among the men. A group insurance plan is also in operation, supplementing the required "Workmen's Compensation," and old-age pensions are in contemplation. The men like the scheme, they receive a substantial return, they are reasonable regarding wage adjustments and they endeavor to keep down the payroll and other expenses.

Dr. F. Herbert Snow, chief of the department of engineering, Public Service Commission of Pennsylvania, was the next speaker. He emphasized the principles of democracy, applying them to the regulation of public service, and deplored the efforts which had been made to abolish the public service commissions. These, he urged, are doing an essential work, and, while the legislation behind them may need some revision from time to time, the basis of their functioning is sound.

Mr. Gadsden then spoke, supplementing his address of the afternoon. He said that he had not intended to paint a gloomy picture in depicting the difficulties of public utility financing, for the industry is now seeing better days. The average fare has been increased by 50 per cent, and while this is much less than increases in materials and labor it is something. Expenses are decreasing, so that, with the co-operation of the commissions and the public, the long-deferred return to utility owners and bondholders ought to materialize. Electric railways have now "rounded the turn" and their condition is far different from that disclosed in the hearings of 1919 before the Federal Electric Railways Commission.

Hon. W. D. B. Ainey, chairman of the Pennsylvania commission, followed Mr. Gadsden. He expressed on behalf of his colleagues and himself a sympathetic interest in the solution of public utility problems. The commission has desired that equitable rates be provided for, but has been handicapped by contracts entered into by the electric railways when the eventual inadequacy of a 5-cent fare was not realized. Moreover, the commission has to operate within the provisions of the public service company law, which gives no jurisdiction over securities unless requested by the utilities.

Mr. Ainey credited the railway men with the exercise of initiative, which led to the solution of their problems. He felt confident now, as he had before, that the difficult problems ahead will be solved. The commission will co-operate with them and, as was indicated by the "Wilkinsburg decision," the legal rights of the utilities will be recognized. However, the commission will be embarrassed in its work in placing values upon utility property until some legal definition of "valuation" is agreed upon. All interests involved should strive to this end. Furthermore, too much dependence must not be placed upon law, for after all the appeal must eventually be made to enlightened public opinion, to the "heart basis" of constitutional rights. The local problems, also, are interwoven with national ones, necessitating a general public interest in their solution.

In closing, Mr. Ainey impressed on his hearers the fallacy of thinking of laws and political majorities in terms of the mass. After all, the operation of a law affects the individual primarily. While enacted by the majority, it lays its hand on the minority, whose rights are just as sacred as those of the majority.

## The Electric Railway and the Community*

BY DANIEL N. CASEY

Director Field Service Bureau Pennsylvania State Chamber of Commerce, Harrisburg, Pa.

THE electric railway has been maligned and misrepresented, but it has persisted because it is a public necessity. Not long ago it was quite popular to condemn transportation systems, and there was a time when many deserved censure. Those days are done. Most street railway men now realize that they owe something to the communities in which they operate and to the men who aid them in functioning, as well as to the investors.

The community must have the street car and the street car must have the community. Their interests are mutual. The street railway, like the school and the church, serves the entire community. The banker who drives to his office in an automobile is able to serve a public ten times as large as he could serve otherwise because of the street railway. The clerks can work in the city, where wages are high, and live in the suburbs, where rents are comparatively low. Real estate values in the business districts are much higher because the cars bring to town thousands of people who could not do business there otherwise. Suburban property is more valuable because the cars make it accessible to the city. Residential property is increased in value because it is located near a car line. Even if a man always walks or always drives in his motor he derives a dollars-and-cents benefit from the street railway. The community has a big stake in the success of the traction company. It must see that there is an orderly development of this as well as its other democratic institutions.

### ELECTRIC RAILWAY SERVICE IS FUNDAMENTAL

The street railway industry is the most important in any community because it makes all other industries possible. Take away the means of transporting the workman to and from the factories and the factories cease to function. So the manufacturer and his employees have an interest in the trolley lines.

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*Abstract of paper read before Pennsylvania Street Railway Association, Harrisburg, Pa., June 16, 1921.

Moreover, there is a social side of the local transportation, not only in that it produces a commingling of the various community factors, so essential to co-operative development and success, but if the transportation be not reasonably comfortable and adequate the impression upon the minds of the workmen may be the reverse of that which is highly to be desired in this period of stress. Although the treatment of the problem is primarily local, its scope is national because it is essential to the highly efficient industrial productivity through which the nation must carry out its program of reconstruction.

### HOW THE CITIZENS CAN HELP

Both the store and the street car company must sell service; each is essential to the other and both are institutions integral to our community fabric. To promote the interests of the street car company, which in the end will help his business and aid in the constructive development of his community, the merchant can protest when drastic ordinances are proposed, when vehicular traffic is unjustly favored, when undue regulation of trolley companies is considered and when unfair advantage is taken of the street railway.

The citizen's work is most effective when it is united with that of others. Nearly every chamber of commerce has a transportation committee, which might well give heed to the street railway problem in general and to special problems as they arise. This committee should be advised of those points by the individual citizen as he learns of them and he should be prepared to assist the committee in its investigation and reports.

Last winter the Pennsylvania State Chamber of Commerce took a referendum among its membership as to whether the Public Service Commission should be granted increased authority to suspend rates pending a hearing. It was the opinion of the majority of the membership who answered this referendum that such authority should not be granted, and therefore our legislative bureau protested against the proposal. The bill was subsequently defeated. The voice of the State had spoken. It said that the utilities should not be further hampered.

The Chamber of Commerce of the United States appointed a committee on public utilities with regard to local transportation. The recommendations of this committee, submitted to the membership of the national chamber for referendum, were approved almost unanimously. The approval indicates that the broad-minded business man realizes the imperative necessity of retaining the vitalization and private ownership of street railway companies. These referendum results and the enthusiastic co-operation of many communities with the transportation companies show that the keen business man appreciates the problem and realizes that prosperity for one institution in the community aids toward prosperity for all. Very seldom now is there a disposition on the part of the public to cavil at the trolley company merely because it is a corporation. There is a better spirit and a heartier desire to help.

In nearly every instance the street railway has laid its cards on the table. It is here, a definite institution in our communities. It may have erred in the past, but let us not forget the pioneers who stretched the rods of steel into country formerly untapped and brought conveniences and comforts to the doors of those who seldom knew them and who forged communities together into a closer relationship. They have made us more American. Our work is with the railway of today in the constant developing of the twentieth century American city, and their work is with us for this common purpose.

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## Practical Personnel Work[*]

### BY W. H. BOYCE

General Manager Beaver Valley Traction Company, New Brighton, Pa.

A DOZEN men engaged in personnel work would give as many definitions of this work. Tead and Metcalf define personnel administration as "the direction and co-ordination of the human relations of any organization with a view to getting the maximum necessary production with a minimum of effort and friction and with proper regard for the general well being of the workers."

Until recently no attention was given to the personnel of an organization. A foreman, superintendent or other official in charge was held to be the "whole works." If there was success, it was due to the foreman; if there was failure, it was his fault, as his superior held him responsible. The loss to industry through incompetence of foremen has been great. Later, the idea developed that employees have a share in success or failure and that all are necessary. That, in embryo, is "personnel." Personnel is a science, the fundamentals of which are possessed in some degree by all.

In this paper I shall deal with personnel along its applied lines, with frequent reference to methods tried and proved in a small organization, but applicable in part to a property of any size. The administration of personnel work on a small property is the general manager's responsibility. On properties large enough to warrant the organization of a personnel department, the head of that department should be a member of the president's staff.

### WHAT PERSONNEL WORK IS

To me personnel work has meant: (1) Realization of the needs, a well-charted purpose and definite plans for progress; (2) selection of employees and fitting them into proper positions; (3) keeping the employees satisfied; (4) determination, from results, of correctness of purpose, plans and selection; (5) weeding out, changing about, building up; (6) analysis of everything having to do with the previously determined needs, plans and purposes.

While on a small property the personnel is the general manager's responsibility, it does not follow that he is personally to do all the work. He must gather about him a group of trained assistants to carry out the details.

The general manager must realize that it is not he who is in daily touch with the public but rather the trainmen; that trainmen, barnmen and shopmen have more to do with the actual selling of transportation than he has.

### GETTING THE EMPLOYEE STARTED RIGHT

Personnel work begins with the visit of the applicant for employment. The man in charge of that department must have had a wide experience; must know that even in declining employment to the applicant he has an opportunity to make a good impression for the company. He should proceed to select his men on the basis of physical qualifications, intelligence, education, temperamental requisites, appearance, character, common sense, practicality and general personality.

It is the duty of the man in charge of employment to explain to the applicant the character of work to which he will be assigned, the hours of work, the rate of pay, the chances for advancement, the policy of the company toward the public and its employees, and the methods used in keeping a check upon and record of the actions of employees.

He "sells the job" to the applicant by creating an interest in it. An extreme case where this was not done was the following: On a certain railroad the president sent for an employee who had been in the service and engaged on one job for thirty-five years, to award him a cash prize and to compliment him on his continuous service. In answer to a question as to his duties, the workmen said that when a train came into the station he went along each side and tapped the wheels with a hammer. Asked by the president why he did this, he replied: "I'm darned if I know." The man had been drawing wages for thirty-five years without knowing what he was really paid for.

After the applicant has been accepted he is placed under the direction of a foreman or instructor, who has been properly trained as to his attitude toward the new employee. Instructors, especially those for trainmen, should realize that the greenhorn is in the same position as they were in when they entered the company's employ.

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[*] Abstract of paper read before Pennsylvania Street Railway Association, Harrisburg, Pa., June 16, 1921.

### DEVELOPING MORALE IN THE ORGANIZATION

Personnel work develops an organization whose members have more than the wage-drawing habit. Its essentials are: (1) Careful selection; (2) proper instruction; (3) continual satisfaction; (4) consideration; (5) absolute justice to all; (6) placed responsibility; (7) supervision, continual instruction and job education; (8) supervisory and managerial vision.

On our property we have an employees' service code, which has been freely distributed publicly, and has produced good results. Our rate of labor turnover is small, and our list of applicants for trainmen positions exceeds 50 per cent of the number employed. Every employee planning to leave our service is first interviewed by the employment supervisor. If he is dissatisfied, an effort is made to remove the cause and to retain him in our employ. Our promotions are from within the organization, according to a charted promotion plan. Employees are additionally trained in their promotion lines. Since December, 1920, we have had but one trainman resign and were compelled to discharge but one, and that for discourtesy.

Through bulletins, letters to the homes of the men and talks we show them that their welfare and the company's welfare are so closely allied that they cannot afford not to be on the alert for the company's interest. We trust our employees and they trust us. We know them; they know us. Finally, it may be said that success is assured through applied personnel only when the proper attitude toward the employee is maintained from the head of the organization down.

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## Experience with the One-Man Car*

BY CLINTON D. SMITH
General Superintendent Pennsylvania-Ohio Electric Company, Youngstown, Ohio

THE purposes of this paper are to point out the economies that have resulted from the operation of thirty-two Birney one-man cars upon the property of the Pennsylvania-Ohio Electric Company and to indicate the potential savings which are being realized from time to time. This type of car is being operated upon the New Castle and Sharon, Pa., lines of the property, and in addition twelve cars are in service on one of the lines of the Youngstown (Ohio) Municipal Railway, a subsidiary of the company. These cities, from the industrial standpoint, are chiefly notable for their steel mills. They have populations respectively of 50,000, 20,000 and 135,000.

### INTRODUCING THE ONE-MAN CARS

The larger number of Birney cars used by this company are operated in New Castle, the car-mileage of the line using the cars being 71 per cent of the total New Castle District mileage. In New Castle there are some extraordinary features in connection with the use of the one-man car which do not exist in Youngstown and Sharon. Attention is directed to the fact that on practically every street upon which the Birney cars operate the clearance is approximately 6 in. between the car and an automobile parked along the curb line. This fact is worth consideration in connection with the reduction in the number of accidents which has resulted from the use of the one-man car.

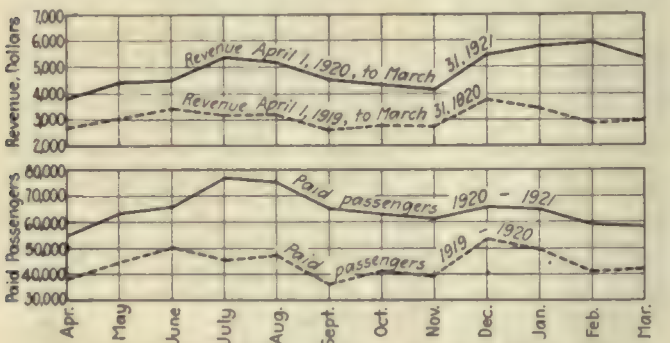

FIG. 1—DATA FOR EAST HILL LINE, SHARON, PA., EQUIPPED WITH SAFETY CARS

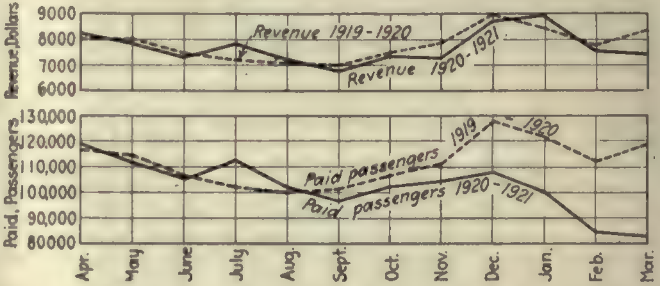

FIG. 2—DATA FOR VALLEY LINE, SHARON, PA., OPERATED WITH TWO-MAN CARS

In introducing the Birney cars in New Castle the company had to recognize: (1) that schedules were in effect that provided beyond question adequate service and that gave employment to seventy-six men on regular runs; (2) that the average length of ride was less than 1½ miles and the maximum continuous ride was approximately 2 miles; (3) that there were severe grades on all lines, with a maximum of 9 per cent.

The first five cars were placed in operation in September, 1919, and provided a six-minute service where formerly a ten-minute service had been furnished, increasing the seating capacity by 84 per cent. Twenty-five additional cars were ordered and their use was gradually brought about in New Castle and Sharon. Some of the results secured, in the way of passengers carried and revenue received, are shown in the accompanying charts. In Fig. 1 data are given for the East Hill line, Sharon, from April 1, 1919, to March 31, 1921. A 7-cent fare was in effect in 1919 and up to Dec. 12, 1920. A 10-cent cash fare, with six tickets for 50 cents, became effective Dec. 12, 1920. Twenty cars were placed in operation on this line on April 21, 1920. For comparison, the results with the Valley line, Sharon, operated with two-man cars, are given in Fig. 2. This shows passengers and revenue from April 1, 1919, to March 31, 1921. The conditions in respect to fare are the same as those pertaining to Fig. 1.

The results of the safety-car operation show that in every instance during the first five months of 1921 a period of industrial depression, there has been an increase in paid passengers upon lines operated with one-man cars, whereas on the line in which the headway has remained unchanged and has continued to be operated with two-man cars there has been a decrease.

Relative to equipment expense, a special investigation showed that for the safety cars this is approximately 2½ cents per car-mile, including inspection. As to power consumption, special tests showed that the one-man safety cars on one of the lines were consuming 1.26 kw.-hr. per car-mile for propulsion or 1.54 kw.-hr., including heating. These figures include all overhead losses.

In regard to the one-man car as a means of selling transportation, it is obvious that every manufacturer of or dealer in a marketable product must study and apply the principles of salesmanship if he is to have large sales. This applies not only to the sale of commodities in general, but also to the sale of transportation.

Although there are many factors involved in merchandising transportation, frequency of service is a fundamental one inasmuch as it has the greatest effect on increasing the riding habit.

As to advertising transportation, our company has, since the initial newspaper campaign to introduce the safety cars, used the backs of the transfers for advertising. For example, in New Castle the following is printed: "New Castle—50,000 population—served by Birney safety cars—frequent riding permits better service." In the Shenango Valley district we use the following: "Birney safety cars provide frequent service—frequent use permits better service."

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*Abstract of paper read before Pennsylvania Street Railway Association, Harrisburg, Pa., June 17, 1921.

The persistent use of the term "safety" in connection with the Birney cars has had much to do with the increase in the riding habit. The use of this term places an obligation upon the railways operating the cars and upon the manufacturers of the cars to adopt any improved equipment which will add to their general safety, making them as far as possible accident proof.

### MAKING THE SAFETY CAR SAFER

We have made three improvements of the cars used by our company with the idea of increased safety and economy. As some severe grades have to be encountered on the property, we are now installing Peacock brake drums on the staffs of the hand brakes on all safety cars. This will permit the hand brakes to be used not only for emergency purposes but also will make them serviceable. The second improvement has been the installation of safety features on the brake rigging to prevent accidents due to failure at that point. The third is the installation upon all cars of the Lintern mechanical foot sander. This replaces at each end of the car one of the sand boxes formerly operated by air. It is operated by a pedal and guarantees the supply of sand whenever the supply in the box controlled by air has been exhausted.

### A CAR THAT ATTRACTS RIDERS

Summarizing the features of the one-man car in respect to the sale of transportation, the following appeal to us is important: (1) The economical operation of the car permits more frequent headway; (2) the car, being the last word in modern mechanical electrical equipment, appeals to the people in the same manner as the modern department store and encourages the frequent use of the car; (3) appreciation of the fact that the car is fully equipped with safety devices tends to increase the number of rides per capita.

Finally as to accidents with the safety cars as compared with two-man cars our analysis indicates conclusively that there are fewer accidents with the safety cars. There has been a practical elimination of boarding and alighting accidents.

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## What Automobile Traffic Means to Pittsburgh*

By C. K. McGUNNEGLE AND M. T. MONTGOMERY

Assistants to the General Manager Pittsburgh (Pa.) Railways

PITTSBURGH'S narrow streets, steep grades and sharp turns are but the result of normal community growth without any conception of a definite plan. The result today is that the automobile traffic on these streets seriously interferes with the operation of street cars and presents a difficult problem for solution.

The central business district, known as "The Point," is extremely small, for, including street and alley space and wharves on the two rivers, it covers but 218 acres. Of this area the streets and alleys take up 63 acres and the railroad terminals 30 acres, leaving but 125 acres for commercial use. This area is but 30 per cent of the total as against an average for other cities of about 40 per cent. Traffic congestion is invited by the very arrangement of the streets, for practically none of them is continuous across the central business district. Many are on steep grades. Only one street is wide enough to permit two lines of vehicles between the car tracks and the curb.

Freight houses of the steam roads are so located on the North and South Sides and in the city itself that all trucking from one to the other must pass over the most congested city streets or take the long way round two sides of the triangle. As far back as 1910 vehicular congestion became so serious on the two main north and south streets, Wood and Smithfield, that the Pittsburgh Railways and the city of Pittsburgh entered into an agreement whereby the space occupied by one track on each of these streets was given over entirely to vehicular traffic. In 1918 the one-way traffic movement was extended to take in Penn and Liberty Avenues between the city and Thirty-second Street. However, the increase in the number of automotive vehicles is fast overcoming the relief at first experienced.

In 1915 there were 131,000 automobiles registered in Pennsylvania. In 1920 there were 600,000, of which number 50,000 came from Pittsburgh. In July, 1917, a count, made between 7 a.m. and 6 p.m., of the number of vehicles entering and leaving the central business district, showed approximately 47,500. A similar count made in October, 1920, indicated the total had increased to 60,519. Into this mass of vehicular traffic sixty-one routes of trolley cars are run by the Pittsburgh Railways system.

The cars vary in size from those of the single-truck type, taking up 216 sq.ft. of street space, to the double-truck type which take up 428 sq.ft. A street car rider occupies about 4.5 sq.ft. of street space. Ford automobiles occupy 60.5 sq.ft. and Packards and the larger types of touring cars occupy 94 sq.ft., while trucks occupy from 132 to 190 sq.ft. Actual counts have established the fact that but 2.5 people, including the driver, form the average passenger load in Pittsburgh for pleasure cars. It follows, therefore, that an automobile passenger takes up considerably more street room than the car rider.

The difficulty in enforcing traffic and parking regulations has been a most serious drawback. Pittsburgh streets are so narrow that any form of vehicle stopped at the curb throws all moving vehicles onto the car tracks. The resulting congestion recently became so serious that City Council passed new parking regulations whereby machines are permitted to stand for thirty-minute periods only and then only in certain districts. Parking is not permitted on any business street between 4:30 and 6 p.m. Enforcement of these regulations has been of material benefit, although a broken-down automobile, until it can be removed, will still cause the old-time congestion.

### TOPOGRAPHY INVITES CONGESTION

The topography of the country limits the number of highways interconnecting the surrounding towns. Almost all of these carry car tracks and for years the railway has maintained many of the miles of paved roads in this district. Naturally, all kinds of vehicular traffic is attracted to these roads and the cars, though miles outside the city limits, are subject to more or less interference. Road improvement goes on from year to year by state and county authorities and some relief will eventually be had, but it will not be noticeable until drivers are educated away from the old routes and until more and better roads are completed.

Prior to 1918 cars on this system were operated on the pay-as-you-enter system for both inbound and outbound trips. During 1918 general congestion became so serious that something had to be done to get cars through the terminal district with less delay. It was decided to retain the pay-as-you-enter collection on inbound trips and change to the pay-as-you-leave system for the outbound trips. Checks show that the loading time had been reduced to about one-third. This manner of fare collection has some disadvantages, but delays incidental to fare collection occur at outlying points where congestion is slight and delays incidental thereto are reduced to a minimum.

### LOADING PLATFORMS AND MID-BLOCK STOPS SAVE TIME

During the last year or two safety zones have been established at many points in the city and six loading platforms have been erected. The city should build additional platforms throughout the congested area, since their worth on the narrow streets has been proved.

Mid-block stops have also been used to facilitate getting cars through the congested area. At other points where the near side stop is retained there are "First Car," "Second Car," "Third Car" signs marking stopping places. Multiple loading and unloading have been found to save much time, particularly during the rush hours or in the handling of large gatherings at other times.

The automobile, from the traffic point of view, has done the street railway much injury. However, there is one point in its favor and that is, it is a fast moving unit and will not cause delays if there is enough street room for it to keep moving.

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*Abstract of paper read before Pennsylvania Street Railway Association, Harrisburg, Pa., June 17, 1921.

# The Helical Gear*

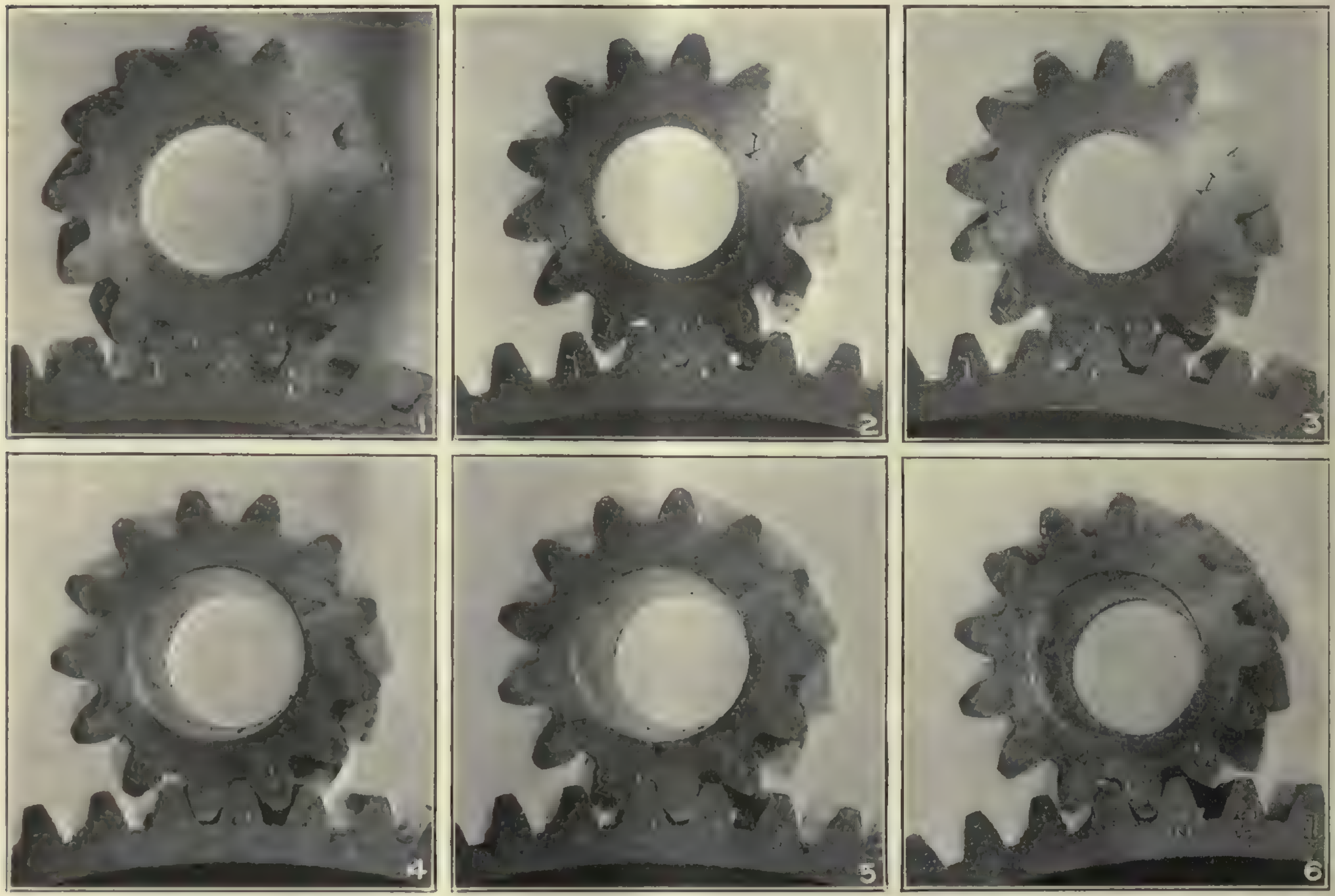
By W. H. Phillips
R. D. Nuttall Company,
Pittsburgh, Pa.

and

G. H. F. Holy
Westinghouse Electric & Manufacturing
Company, East Pittsburgh, Pa.

THE problem of the designing engineer in the field of gearing is the transmission of heavier torques at higher speeds with lighter weight equipment and less deterioration. The progress that has been made in the line of gearing may be outlined as: (1) Improvement in materials; (2) application of heat treatment; (3) development of flexible gears; (4) development in the method of forming teeth, rotary-cut, hobbed, planed, blocked-out and ground; (5) application of helical gears.

In electric railway service in cities the pinion used in spur gear operation has from thirteen to sixteen teeth. In such a pinion for part of the time but one tooth is in contact with the corresponding gear tooth. It picks up its load across its entire face suddenly. It may be considered as a beam fixed at its root and loaded as a cantilever by the motor torque. The sudden load application produces two deflections, varying with the loading. Spur-tooth contact under load is unavoidably accompanied by shock and vibration.



SUCCESSIVE POSITIONS OF HELICAL PINION AND GEAR TEETH THROUGH THE CONTACT PERIOD

Fig. 1—Tooth 2 just entering contact.
Fig. 2—Tooth 2 in contact near center of face.
Fig. 3—Tooth 2 just leaving contact.
Figs. 4 to 6—Positions of reverse face of gear for tooth positions shown in Figs. 1 to 3 respectively. The "A" face of Figs. 4 to 6 shows the following in of the helixes across the face, the "K" face shown in Figs. 1 to 3, being in advance of "A" as regards the helix.

Where large capacity equipments are involved, such as locomotives and multiple-unit cars for terminal electrification on trunk lines, the flexible gear has been used to soften or dampen the vibratory action of the gearing due to the phenomenon mentioned and also to other causes. In city service this would be too expensive, although there are cases of interurban service where it could be used with advantage.

The helical gear overcomes inherent gear vibration by eliminating the so-called "stepping over" action. The operation of this type of gear can best be realized by thinking of it as made up of a number of thin spur gears twisted on the shaft with respect to each other. Helical gears transmit practically average motor effort with properly maintained bearings. The gears tend to wear evenly over the full tooth length, thus preserving the original tooth form.

The contact from the tip of the tooth to the root and across the face is the property inherent in helical gearing which produces the smoothness of gear action. The action of engagement from one side of the tooth to the other is practically one of pure rolling. The action from the tip of the tooth to the root is one of sliding and rolling. The percentage of rolling action can be predetermined, within reasonable limits, and the teeth can be designed to give a maximum percentage of rolling.

As a result of this rolling contact across the face there will be at any time (after the tooth has come into full mesh) tip, pitch line and base contact. This tends to maintain the original tooth form. In the case of the spur gear it is in contact across the face first at the tip and then progressively from the pitch line to the base. From the design of the involute form of tooth, there is pure rolling at the pitch line, while at the tip and the base there are sliding and rolling. The tendency is thus to greater wear at tip and base. As the gear wears it is continually destroying the original tooth form.

As to helix angles, values from 5 deg. up to 20 deg. have been tried in all classes of railway service. From the results of service data an angle of 7½ deg. was prepared to meet all requirements, both for new and existing equipment. An angle that would provide approximately 13 per cent end thrust seemed desirable to give a cushioning effect.

The end thrust from a gear with 7½-deg. helix angle produces sufficient thrust to reduce the lateral movement of the rotating element and provides a cushioning effect on the bearing when there is lateral movement. An oil film is thus maintained.

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*Abstract of paper read before Pennsylvania Street Railway Association, Harrisburg, Pa., June 17, 1921.

Most helical gears and pinions have a right-hand helix on the pinion and a left-hand helix on the gear. There is no particular virtue in this arrangement except for standardization. Where maintenance conditions make it desirable to reverse the gears this can be done without difficulty.

It has been felt for some time that the tooth form in general use in railway gearing is unsatisfactory. No improvements were suggested or considered, however, as a change would introduce two standards. With the introduction of the helical gear the full advantage of the latest developments in tooth form could be utilized.

With this condition in mind the tooth form adopted with the helical gear is of the so-called "long and short addendum type." This has the following advantages over the old form: (1) Increased strength; (2) greater rolling action; (3) more metal from root of tooth to bore of pinion.

The angle of approach is much smaller than the angle of recession in the new tooth, which tends to smoother tooth action. The new tooth is substantially stronger at the base, to the extent of from two to two and one-half times. Further, the rolling action of the new tooth varies from 55 to 70 per cent pure rolling, whereas the old 14½-deg. tooth gives approximately 40 per cent rolling in the involute zone. This is an increase of nearly 50 per cent rolling contact. A study of recent spur gear design has brought out several different types of long-and-short-addendum teeth. These all have specific advantages over the old form of spur gearing and are being given considerable publicity.

### ACCURATE TOOTH FORM POSSIBLE

The helical gear is manufactured by the generating process, the tool being a ground hob and the cutting edges being of rack form. This method of tooth generation insures a high degree of accuracy.

Comparative tests made on the efficiency of helical and spur gearing showed a slightly higher efficiency for the spur gear, the difference between them being so small as to be considered negligible.

Obviously when vibration can be reduced the over-all efficiency of helical gearing will be much greater than that of spur gearing.

Extensive applications of helical gearing in electric railway service have been made with motors of from 250 hp. down to 25 hp. The gearing involved ranged from 2 diametral pitch to 4¼, and from 5¼ in. face to 3½ in., with ratios of 25:48 to 13:74 inclusive. It has also been applied in several sizes on electric locomotives.

In most cases the helical gearing in electric railway service has been in operation from one to two and one-half years. The trial installation service mileage is approaching 400,000 with a minimum of approximately 150,000. Records show that in service helical gear operation reduces motor maintenance, increases gear life, and reduces gear noise and vibration. The lateral wear on motor and axle bearings is no greater than in spur gear service.

With 20,000 to 25,000 helical gears and pinions manufactured to date, and with the increasing demand for them in initial installations and in changing over old equipment, it is obvious that the helical gear is with us and will help to solve the problem of quiet, efficient, long-life transmission.

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# Equipment Men Discuss Problems

## Information Brought Out of Value to Men Engaged in Car Maintenance—Reclaiming Worn Air Compressors, Causes of Freezing in Piping, Experience with Ball Bearings, Etc., Discussed

GATHERING forty-eight strong at Akron on June 8, 1921, the Association of Electric Railway Men, comprising the equipment men of Ohio, Pennsylvania and West Virginia, joined in their usual informal round-table discussion of rolling-stock maintenance matters. The discussion was led off by a paper on the maintenance of air-brake equipment by J. F. Craig of the Westinghouse Air Brake Company. Mr. Craig described the essential details of the various types of air brake equipment as used in city, interurban, subway, elevated and electric locomotive service.

In the discussions that followed this paper it was brought out that there is a small amount of leakage at the power valve or foot valve used on safety cars. This leakage is most noticeable when the doors are open and the brakes are applied, as the operator at this time keeps his hand on the controller handle or his foot on the foot valve.

In reply to a question as to the practice of his company in reclaiming worn air-compressor cylinders, Mr. Craig said that it is rebushing cylinders and then reboring them to standard sizes. P. V. C. See of Akron said that his company is doing this work in an ordinary engine lathe. The necessary bushings are bought with rough bores and are finished after they have been pressed into position. I. E. Church of Pittsburgh said his company is using bushings with four feet, which are used to bolt the castings to the lathe faceplate for turning and finishing. This scheme has advantages in making it easier to set up the casting in the lathe and results in better boring.

Discussion regarding the types of air-compressor rings used brought out the fact that three rings of the snap type are now usually used. The ring near the end of the piston acts as a wiper and keeps the oil from getting into the air. Mr. Craig explained a method of checking air-compressor performance by use of an orifice testing device with a standard-size tank. The time necessary to raise the pressure from point to point is taken, with the compressor removed from the car. The general opinion was that it is more satisfactory to remove compressors for testing and that uniform voltage is essential; otherwise the speed of pumping will vary.

Discussion of remedies used to prevent freezing of the air system brought out that a generous quantity of radiating pipe is of great assistance. Some companies have used anti-freeze devices with good results. Mr. Church described measures used by his company with success, which included the installation of piping having a diminishing size at each elbow from the reservoir to the first tank and from the second tank to the train line. The sizes gradually diminished from 1½ in. down to ¾ in. On some of the newer cars the size of piping used is diminished from 2 in. to ¾ in. in the direction of flow. In general, freezing is due to insufficient drainage or "pockets" in the piping. This led to a discussion as to the best location for the air intake. Some representatives felt that the strainers clog up to a greater degree when located inside the car than when underneath, and a case was cited where the strainer was found to be stopped with a kind of felt mat which probably came from the plush seats. In regard to the location of the strainer on the car roof, it was explained that this involves an additional length of pipe with greater possibility of leaking. Mr. Delaney of the General Electric Company said that his company is recommending putting the strainer inside the car as the greatest difficulty had been experienced from the dust when installed underneath. He said that the G. E. type of strainer should be cleaned about once in six months.

### ELIMINATION OF KEYWAYS IN ARMATURE SHAFTS

In the discussion as to the necessity for using keys to hold pinions in position, the general opinion seemed to be that satisfactory results could be obtained without keys. A. B. Creelman of the Youngstown Municipal Railway said that his company has done away with keys in the pinions and so far has never had a loose one. Others said they had been following this practice with good results. This led to a discussion as to proper methods of installing pinions. In general most railways seem to be using the hot water method of heating pinions before they are installed. J. L. Crouse of the Westinghouse Electric & Manufacturing Company said that the Norfolk & Western Railway is shrinking pinions on by using gas heat, as it is impossible to get a sufficiently high temperature with hot water. They are removed in the same way.

Experience with the use of ball bearings was varied. Some expressed the opinion that they have proved very satisfactory, while others had found them unsatisfactory. It was pointed out that a new type of roller bearing which is adjustable has been recently brought out by the Gurney Company for electric railway use which eliminates the necessity for shrinking the race on the shaft. This has proved a particular source of difficulty in previous types.

There was considerable discussion in regard to the cause of side wear on brushes, and it seemed to be quite generally agreed that this was due to dirt principally. G. F. Randolph and P. D. Manbeck of the National Carbon Company said that to a certain extent this wear could be eliminated by using close-fitting brushes which would assist in keeping out the dirt which starts the wear. Mr. Creelman said his company is getting much less side wear on the brushes on cars operated on paved streets than on equipment with no paving. He said that he was convinced that the cause of this side wear is dust, as he is averaging 8,000 miles per brush in ventilated motors and 12,000 miles in closed motors.

In the discussion on methods of cleaning cars, one master mechanic stated that ONC cleaner, when diluted one part to seven or eight parts of water, will still bleach the enamel, where Modock cleaner will not bleach but will darken the enamel somewhat. Another master mechanic said that he is getting twice the life with Old Dutch enamel than he obtained with flat colors and that he is using clear water and a little soap for cleaning this. Another member suggested that he has been very successful in brightening dull enamel by using an ammonia solution one part to about eight or ten parts of water followed immediately with clear water.

The association was entertained at luncheon at the Portage Hotel by the Northern Ohio Traction & Light Company, after which the members made an inspection trip to the company's shop.

## Rail-less Transportation to Be Taken Up by New England Club

THE New England Street Railway Club has appointed a committee on one-man car, trackless trolley and motor bus operation. This committee is to study the possibilities of each form of transportation as it affects New England, and report at the February, 1922, meeting of the club. The personnel of the committee follows: Louis Pellissier, Holyoke, chairman; W. J. Flickinger, New Haven; H. F. Fritch, Eastern Massachusetts Street Railway; John Lindall, H. B. Potter, and H. W. Putney, Boston Elevated Railway; and Albert S. Richey, Worcester, Mass.

# American Association News

## Committee of 100 Postpones Banquet

THE Committee of One Hundred of the American Electric Railway Association has decided to postpone the banquet scheduled to be held in New York on July 8, the reason being the impossibility of obtaining the speakers desired. The event will be held some time in the fall, when it is expected that an interesting program can be arranged.

## Association Takes Up Study of Trackless Transportation

ON June 24 the newly appointed American Association committee on trackless transportation, of which H. B. Flowers, United Railways & Electric Company, is chairman, met at association headquarters to organize and discuss how the general subject of rail-less transportation could best be presented at the coming convention. The other members of the committee present were C. B. Buchanan, Virginia Railway & Power Company; Edward Dana, Boston Elevated Railway; C. J. McPherson, J. G. Brill Company; R. W. Meade, formerly with Detroit Motorbus Company, and W. H. Burke, proxy for C. W. Kellogg, Stone & Webster Management Corporation. Absent members were G. A. Green, Fifth Avenue Coach Company; H. L. Howell, National Railway & Appliance Company; A. W. McLimont, Winnipeg Electric Railway; H. A. Mullett, the Milwaukee Electric Railway & Light Company; Albert S. Richey, Worcester, Mass., and E. B. Whitman, Public Service Commission, Baltimore, Md.

A discussion brought out that about the only way in which something concrete could be put before the October meeting would be for sub-committees to handle different phases of the subject and then to collate these reports into one for the committee as a whole.

The report as planned will have a preamble on the field of the motor bus and a discussion as to the trackless trolley installation at Richmond, covering mechanical features, costs, and passenger loading limitations. General information as to the type of bus, costs of operation, depreciation, etc., will be shown for different operating motor bus companies. Similar statistics will be given for foreign systems as well as for those in Canada. An analysis will be attached as to what might be a fair differential for fares as between bus and rail cars. The report will also include an article on the desirability of a unified transportation system from the public service commission viewpoint.

The committee hopes to hold another meeting the early part of July, at which time the report for presentation will be prepared.

## Committee on Reorganization to Meet

PRESIDENT GADSDEN has called a meeting of the committee on reorganization to be held in New York on July 8. At this meeting the committee expects to determine the changes in the constitution of the association necessary to carry out the reorganization plans under consideration and, if possible, to have its recommendations as to necessary changes in the organization in definite form. Members who have suggestions which they desire to have considered by the committee should forward them to President Gadsden, if possible, before this meeting.

## Two-Day Session of Power Distribution Committee

THE power distribution committee of the Engineering Association held a two-day meeting at the association headquarters, New York City, June 16 and 17. Various reports of the subcommittees appointed on the seven subjects were presented and final decisions were reached regarding the reports of the committees to be presented at the October convention. Those present were Charles R. Harte, the Connecticut Company, chairman; C. C. Beck, Ohio Brass Company; Ralph W. Eaton, public service engineer, Providence, R. I.; H. H. Febrey, American Steel & Wire Company; C. A. Harrington, Pennsylvania Ohio Electric Company; C. H. Jones, Metropolitan West Side Elevated Railway, Chicago; F. McVittio, New York State Railways; M. D. Rosevear, Public Service Railway of New Jersey; W. Schaake, Westinghouse Electric & Manufacturing Company, and F. J. White, the Okonite Company.

## Rhode Island Men Have Annual Outing

ON SATURDAY, May 21, the Rhode Island Company section held its fourth and most successful annual outing at the Warwick Club, Warwick, R. I., with an attendance of over 100 members. A program of sports was the feature of the afternoon, after which the members partook of a Rhode Island clam dinner. The outing was under the direct supervision of William B. Spencer of the transportation department and eight assistants from other departments.

On June 9 the last monthly meeting of the section for the current year was held. Superintendent Rounds of the Broad Street carhouse gave a talk on the duties of a carhouse superintendent. He stated that one of his duties was to provide enough service, but not too much, by means of trippers and extras. He said that he keeps informed of the riding on the various lines by encouraging the platform men to give him this information.

# Recent Happenings in Great Britain

## Prospects Better for Settling Miners' Strike—Tramways Burn Coal —Many Roads Inconvenienced

*(From Our Regular Correspondent)*

At the time of writing there are good prospects of an early settlement of the coal miners' strike which has been running its disastrous course since the beginning of April. Renewed negotiations between the mine owners and the miners' representatives are promising. On the other hand there is serious trouble in the engineering trade and in the cotton industry over wage reductions. Meanwhile, through the general dislocation caused by the coal strike the number of unemployed in the country has risen to about 2,000,000.

Several by-products of the strike are of interest in the traction field. Perhaps the most significant, as regards the future, is the substitution of fuel oil for coal in the power stations. This substitution has been carried out in many places in the country. One of the earliest changes of the kind was adopted by the London underground railways at their generating station at Chelsea. This is the largest purely traction station in the country. The large stocks of coal in hand were becoming exhausted and though some foreign coal was arriving by sea there was difficulty in getting it discharged owing to an embargo by the transport workers against handling imported coal. They thought it would help the cause of the miners.

In the ordinary way the Chelsea station needs to have fifty-two of its big water-tube boilers at work during the rush hours. The job was put in hand and was completed in about ten days of adapting the sixteen of the boilers for oil firing. This did away with the consumption of about 320 tons of coal a day. The oil is pumped from tank barges which bring it into the river creek beside the power station. The experiment has been successful and should necessity arise more boilers will be converted. The landing of foreign coal, however, went on, either through the defection of transport trade unionists or through the employment of volunteers. The remaining trouble about the matter is that the coal from the continent of Europe is frequently of very poor quality for steam-raising purposes.

In a number of places in the country full tramway services have been maintained by adapting power station furnaces for oil burning, and in some cases where services had been restricted the advent of oil has enabled every required car to be put on the road. Hull was the first place to change over completely. Leeds and Newcastle municipal stations followed. (What about the tale of carrying coals to Newcastle now?) The Carville station of Newcastle Electric Supply Company has to a considerable extent been changed to oil burning. This is one of the biggest power stations in the country and supplies power for all sorts of purposes, including traction on the North Eastern Railway local lines. In quite a number of other towns the change is being carried out, while in still others experiments are being made. At the power station of the London County Council Tramways everything has been made ready for effecting the change if necessary, but at the time of writing sufficient foreign coal has been available. Part of the auxiliary plant, however, is now oil-fired.

It has been found that at the present prices of coal and of fuel oil, and taking into account the relative calorific values of the two fuels, the oil is actually cheaper than the coal. Moreover, the supplies of oil are abundant and evidently easily obtainable. The cost of converting a furnace for the purpose of burning oil is small. It will thus be seen that unless there comes a very radical change in the relative prices of oil and coal there is little prospect of any reconversion of furnaces to coal burning. Thus once again the miners have been cutting off their noses to spite their faces. The whole situation is no doubt of deep interest to the great petroleum corporations of the United States and Mexico, especially when it is coupled with the announcement made in the end of May that all new ships of the British Navy will be oil-burning.

A really Gilbertian situation arose during the month of May in connection with the London County Council Tramways. With the object of supporting the coal miners in their strike, the executives of the trade unions of steam railway men and of general transport workers issued orders prohibiting their members from handling or transporting coal brought in from abroad. It should be clearly understood that the British Government did not arrange for this importation of coal for the purpose of breaking the strike, but solely in order to keep essential public services and domestic supplies going. None of the imported coal goes to manufacturing industries.

To a very great extent the members of these trade unions ignored the orders of their executives and unloaded and transported the coal freely. Where they refused they were suspended from employment and plenty of volunteers were available to take their places. The threat of a general strike against this arrangement was futile; the rank and file would not agree. At the power station of the London County Council Tramways at Greenwich, however, the cranemen refused to unload the foreign coal from the ships bringing it in. They were suspended and volunteers took their places. (Volunteers are easily secured when hundreds of thousands of people are out of employment owing to the miners' strike.)

Then a number of employees in the station—some skilled and some unskilled—went on strike as a protest against the suspension of the cranemen. Apparently they did not see that if the cranemen had been successful in preventing the landing of coal the employment of the other workers in the station would be gone. These men's places were also filled.

The pig-headedness of the unions' executives concerned was next further demonstrated by their taking a ballot of all the London County Council tramway employees on the question of striking in sympathy with the power station employees. The ballot was duly taken but the trade union executive refused to publish the figures of the votes recorded. It is known, however, that there was a very large majority against striking; apparently it was so large that the executives were afraid to make it known. Over the country it is safe to say that the enthusiasm for strikes is dying. The grim realities of the industrial and economic situation have been borne in on the rank and file.

During May there was in many towns in England a gradual reduction of tramway services owing to the scarcity of coal. The London underground railways made various cuts for the same reason, despite the partial adoption of oil fuel already noted. A turn in affairs began, however, early in June. The transport workers and railwaymen's unions, realizing that their embargo on the unloading and transport of coal was futile, withdrew the prohibition notices to their members, and coal was thereafter handled freely. Larger supplies began to arrive from abroad. Partly on this account and partly because of the conversion of more steam locomotives to oil burning, the main line railways began to increase their services which had been so much restricted, and improvements also commenced in some of the reduced tramway services.

In the end of May the oil-importing companies reduced the price of petrol by 6d. per gallon, bringing the cost down to about 3s. retail. The reasons assigned are that prices have recently fallen in America owing to production overtaking demand, that the rate of exchange has improved, and that freight rates are easier. The reduction is specially welcome to motor omnibus undertakings, particularly to the London General Omnibus Company, which is the greatest consumer of petrol for traction purposes in the country. That company, instead of having to restrict its services like the tramways, has been extending them. It has also added a series of one-day towns by motor chars-a-bancs through rural districts around London. A whole day's outing including luncheon and tea costs only 21s. On Whitmonday the company set up a new record, even for that holiday. By all its services it carried about 3,000,000 passengers.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Los Angeles Terminal Station Rehearing Resumed

The case of the four large railroads entering Los Angeles proceeding with the construction of a union terminal depot on the Plaza site as recommended by the commission engineers was reopened on June 16 in Los Angeles before President H. W. Brundige and Commissioners H. D. Loveland, H. Stanley Benedict and Erving Martin. A review of this ruling of the commission was given in the ELECTRIC RAILWAY JOURNAL, issue of May 7, page 868.

In asking for a rehearing of the case the companies affected have taken the stand that in instructing the various corporations to establish jointly this passenger terminal the commission was taking property without due compensation, and that its action, therefore, was not valid.

The companies further contend that the problem of establishing a union passenger terminal in Los Angeles, affects three transcontinental railroad lines, and is therefore an issue which only can properly be passed on by the Interstate Commerce Commission. The companies opposing this order of the commission consist of the Southern Pacific, the Atchison, Topeka & Santa Fé Railway, the Los Angeles and Salt Lake Railroad, and the Pacific Electric Railway.

### COMMISSION'S AUTHORITY DEFENDED

The city of Los Angeles has secured the services of Max Thelan, former president of the State Railroad Commission, to assist its city attorney to argue against the reconsideration of this issue by the commission or its transfer to the Interstate Commerce Commission. The right of the Railroad Commission to issue an order relating to a terminal depot in Los Angeles will also be championed by Hugh Gordon, attorney for the commission. In opposing the application of the railroads, the city attorney and special counsel, Thelan, take the stand that the commission has the power to make the railroads comply with its order.

In answer to this position, it is the contention of the attorneys of the railroads that any such power, if ever possessed by the commission, was removed from that body by the passage by Congress of 1920 of the Esch-Cummings act, a law governing railroad transportation and establishing the status of the railroads following the turning back of the corporations to private control after the war. In the event that the commission refuses to grant a rehearing of the case, it is expected that the companies will go before the State Supreme Court and there ask for a writ of review. Pending a decision on this petition for a rehearing of the entire case, it is understood that the opponents of the commission's order will not appoint representative engineers to a common committee for the purpose of working out the details of a union passenger terminal. This committee of engineers was authorized by the railroad commission at the time the original decision was handed down on April 26, 1921.

At this hearing on June 16 motions were made to strike out all reference to the Pacific Electric Railway in connection with the proposed union terminal, and to vacate the terminal order until such time as unquestionable jurisdiction can be established. Frank Karr, attorney for the Pacific Electric lines, suggested that the company which he represents be taken entirely out of the proceedings except in the matter of Aliso Street grade crossings. The companies all laid stress on the fact that they are anxious to proceed at once with such grade crossing elimination as belongs to each individual railroad, and desire to divorce the Plaza terminal question from grade-crossing elimination.

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## Tax-Exempt Securities a Menace

Representative McFadden of Pennsylvania, chairman of the committee on banking and currency, told the House on June 23 that the subject of tax free securities was one of the most vital now before Congress. He is the author of the resolution providing for a constitutional amendment making it possible for the United States to levy an income tax on the interest received from investments in state and municipal securities. He considers exemption from taxation of the income from securities of this kind as an offense against economic law, social justice and the American spirit of fair play.

Mr. McFadden says that such opposition as exists to the elimination of tax exemption arises for the most part from an exaggerated idea of its advantages to the borrower. According to Mr. McFadden loss in tax revenue by the issuance of tax-free securities is appalling. He says that the railways and public utilities, accustomed to look to the wealthy investor for leadership in meeting their needs for funds, have had to go afield and establish new channels not yet adequate to their needs.

So far as action at Washington is concerned Congress appears to be marking time on the revision of the revenue act pending some disposition of the tariff measure in the House. Those close to affairs expect to see some speeding up, however, for it is generally agreed that the country is getting impatient and wants action.

## City Makes Counter Proposal to Security Holders

A tentative proposal on the part of the city to the security holders of the New Orleans Railway & Light Company was submitted to the Commission Council on June 22 by Commissioner of Finance Murphy. It is reported that a majority of the Commission Council has agreed to the plan outlined. Further consideration of it went over, however, until the next meeting of the Commission Council.

### PLAN INTENDED AS SUBSTITUTE

The plan is intended as a substitute to the program outlined recently by Commissioner Maloney of Public Utilities, suggesting the employment of engineering and utility experts. Briefly, it recognizes the justice of the valuation of $44,700,000 placed upon the property by the Citizens' Advisory Committee of Forty and admits that any appeal to prospective investors will be useless without recognition of this valuation. It acknowledges that $5,000,000 of new money will be required during the year following the reorganization of the company, and that thereafter $2,000,000 a year will be required for five years. It directs that the company shall be domiciled in New Orleans with its affairs controlled by residents of New Orleans.

On the purely financial side there would be provision for a return of 8 per cent for the present on new money, with any sum earned beyond $3,000,000 during the first year retained as surplus reserve. To the holders of present securities outstanding would go no more than 6.14 per cent, if earned. Further, the municipality would have authority to readjust the rate of allowable return, with an option in perpetuity on the property, at the base valuation of $44,700,000 plus any new money invested, not counting the surplus of earnings. The city is also to hold an option at 107 a share on the common stock, which is to be reduced to $4,219,300.

### REDUCTION IN FARE RATES

As part of the agreement the corporation upon the discharge of the receiver is to consent to reduction in rates and fare upon completion of the reorganization, which is to be effective by Oct. 15, 1921, and not later than Dec. 31. These reductions in rates would be as follows:

A 7-cent fare; not more than $1.30 per 1,000 cu.ft. for gas; no increase in the schedule of electric rates.

All the rates just mentioned would continue until Jan. 1, 1923, unless conditions favor a lower basis of rates, in which event the rates would be further reduced.

C. C. Chappelle, who has been acting for security holders in the company, had this to say:

> All I can do under any circumstances is to see what can be done with the proposal in the investment market. I can only act as a connecting link between the city and the investor. But I should feel in duty bound to make every possible effort to carry through to success any proposition which in my judgment has a reasonable possibility of being sold to the investors.
>
> I will say frankly, however, that it is a step forward to bring a positive program before the public for discussion and for official action. Out of it a solution may come; nothing could come from inaction.

## Railway Participates in City's Diamond Jubilee Celebration

Various stages in the development of the city of Milwaukee and of its industries were depicted in a historical parade and pageant in Milwaukee on June 18 in connection with the Diamond Jubilee of the city. The pageant was participated in by the Milwaukee Electric Railway & Light Company, which was represented both as a corporation and through the medium of its Employees' Mutual Benefit Association. It was planned to show the development of the industry and to have a fairly representative body of employees march in the parade.

PART OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY'S SECTION OF MUNICIPAL PARADE COMMEMORATING CITY'S DIAMOND JUBILEE

The company had in line an early type horse-drawn street car followed by the latest type electric car. The horse car was driven by one of the company's veteran employees, George Kuemmerlein, Sr., the father of the present superintendent of transportation. Mr. Kuemmerlein, Sr., had been in active continuous service of the company and its predecessors for thirty-seven years. The horse car was last in use in 1885. It seats fourteen, and was in great contrast to the latest type of electric car, seating fifty-two and equipped with the latest safety and pneumatic devices.

The two cars were followed by the color bearers and band of the Employees' Association and then in the order given by a body of veteran company employees, a majority of whom had seen over twenty years of service; a body of trainmen, members of the Women's Auxiliary of the Employees' Association and finally in rows of eight representatives of the various departments of the company arranged by trades. These were dressed in the uniforms of their occupation and carried the tools pertaining thereto.

The company representation in the parade was very effective and was highly commented upon along the route of the march.

## Electrification of Dan Patch Line Being Considered

The Minneapolis, Northfield & Southern Railway, formerly known as the Dan Patch line, has under way a project for electrification by overhead trolley. E. P. Burch, engineer, is making a careful survey of the whole subject. No date is suggested for taking up the project as the report is not yet ready.

The company now has five GE-205 gas-electric engines and three steam locomotives. One locomotive car is a private car, but the regular equipment has a combination baggage, smoker and coach, carrying ninety-four persons. Each of these cars is capable of hauling a trailer seating 104 persons. The question to be determined is whether more of these motors are to be bought or the line electrified and the present equipment converted.

This company has just announced that it will operate from the present terminus at Northfield into Faribault, Minn., over the Chicago Great Western. The company now has 60 miles of track, the main line from the city terminus in Minneapolis to Northfield being 47 miles. Through its connection at Faribault the management expects to make direct freight connections into Kansas City.

Another plan in embryo is the construction of a freight yard terminal at Robinsdale, surburb of Minneapolis, to cost $26,000. The company recently was reorganized and the new plans are the result. By construction of 6 miles of track the company will reach Robbinsdale, where it will connect with the Great Northern and the Soo lines.

**Michigan Interurbans Crash.** — Two interurban trains of the Detroit United Railway crashed between Chelsea and Ann Arbor, Mich., recently and as a result five people are reported to have been killed.

## Telephone Announcers Tried in Boston Subway

The Boston (Mass.) Elevated Railway is experimenting at the Park Street Subway Station with telephonic announcers manufactured by the Loud Speaking Telephone Corporation. A set of five speaking trumpets, all electrically connected, has been installed on the north-bound platform, and plugs for the connection of the transmitting apparatus are located at various convenient points throughout the station.

The platform attendant, or starter, carries the transmitter about with him, plugging-in at any convenient socket when he desires to make announcements. He uses this equipment for announcing the destination of cars, the berths at which the various cars will stop in the station and for warning persons boarding the cars to let the passengers off first. In this way, by the distribution of the speaking trumpets the entire length of the platform, one man can keep a large and constantly shifting crowd informed.

The apparatus appears to have a special usefulness in times of emergency, when cars are delayed, or some accident requires rerouting or any other change in normal operation. At such times the natural impatience of passengers hinders the work of the platform man as everyone crowds around him trying to ask individual questions. With this equipment he can retire to an inclosed booth and keep repeating all necessary announcements, which results in equal service for all.

A number of officials of the Boston Elevated have witnessed demonstrations, and are reported to have been much pleased. If the present experiment proves successful it is not unlikely that the use of this apparatus will be extended to other stations on the subway and rapid transit lines. It has been suggested that when an open drawbridge on the main tunnel and elevated line causes a blockade, a frequent and unavoidable annoyance on this system, these announcers at various stations along the route could be used to inform the waiting passengers as to the cause of the delay and its probable duration.

## New Road Seeks Franchise

Application for a thirty-year franchise for the construction and operation of a single-track railway has been filed with the City Commission of Birmingham, Ala., by the Norwood Street Railway. An ordinance granting the franchise and authorizing the construction was attached to the application and is now being considered by the commission.

The proposed line will start at the end of the present Norwood line of the Birmingham Railway, Light & Power Company and will make a loop through the Norwood Boulevard development of the Birmingham Realty Company.

Construction of the road will cost approximately $500,000, it was announced by officials of the Birmingham

Realty Company. It will be built by the Realty Company through the Norwood Street Railway, a holding company, and eventually will be transfered to the Birmingham Railway, Light & Power Company.

The proposed ordinance granting the franchise and authorizing the line also authorizes the transfer of the road to the Birmingham Company. It provides that plans and specifications must be placed in the hands of the city engineer in four months from the adoption of the ordinance and the road must be ready in one year. The Norwood bus line, which has been operated by a holding company, will be discontinued when the new car line is completed.

## Chicago Renews Attacks on Its Utilities

Evidently stirred to resentment by the loss of its pet measures in the Illinois Legislature, the city administration of Chicago has begun hostile action against the Chicago Surface Lines. Notice has been served on the companies to show before the Illinois Commerce Commission on July 13 why the present skip stop system for cars should not be abandoned. The city has also filed suit for $3,500,000 against the Chicago Railways for money said to be due under an "implied contract." Mayor Thompson sent a special message to the City Council asking that an appropriation be increased for the purpose of continuing the fight against the surface and elevated railways for reduction of rates.

The suit against the Chicago Railways was for the city's share of the net receipts called for by the 1907 ordinance. Payments were tendered to the city when due but were refused because the city lawyers feared that by accepting these amounts they would acknowledge the existence of the 1907 ordinances. The city claims that these ordinances were abrogated when the companies permitted the utilities commission to increase their rates of fare above the 5-cent basis. The money is now claimed as compensation for use of streets, and the city is hoping for a decision which will turn over the cash without prejudicing its pending litigation against the companies.

Special Counsel Cleveland stated that he is preparing to ask the new Illinois Commerce Commission to re-open the rate and valuation cases of the surface and elevated companies.

## Court Asked to Decide When a Board of Arbitration Is an Arbitration Board

Whether the 250 conductors and motormen of the East St. Louis & Suburban Railway, East St. Louis, Ill., will accept a cut of 19 cents an hour, effective on July 1, was scheduled for consideration at a meeting on June 29.

Notice of the cut was posted by President W. H. Sawyer, following the granting of a temporary injunction by Judge English of the United States District Court restraining a board of arbitration from continuing to consider the wage question after the company's representative on the board had resigned.

The court held that the resignation of C. E. Smith, a consulting engineer, practically ended the legal existence of the board. The resignation was due to the pressure of other business engagements.

President Sawyer offered to appoint a new member for the formation of a new board of arbitration, but this offer was rejected by the union (Amalgamated) which sent for one of the international officers who has arrived for the meeting June 29.

The motormen and conductors now get 70 cents an hour, flat. The cut brings the pay down to 46 cents an hour the first three months, 49 for the following nine months and 51 cents after the first year of service. It is the rate that was established by the War Labor Board in 1919, and was in effect until April of last year.

## News Notes

**Property of Railway Burns.**—Dighton Rock Park, built several years ago for amusement purposes by the Eastern Massachusetts Street Railway, was destroyed by fire on June 15. The park was located between Taunton and Fall River. The buildings in the park cost $60,000 when erected, thirty-six years ago.

**Utility Commission Proposed in Louisiana.**—The Constitutional Convention has written into the new organic law of the State of Louisiana a section changing the Railroad Commission to the Louisiana Public Service Commission. The commission, composed of three members, is empowered to supervise, regulate and control all railroads, street railways and interurban railroads, gas, electric light, heat and power and other public utilities and to fix the rates.

**Foreign Countries Will Participate.**—Another step has been taken by way of preparation for the International Exposition to be held in Portland, Ore., in 1925. The Senate has passed a bill authorizing the President to invite foreign countries to participate in the exposition. The exposition is intended to celebrate the completion of the transcontinental and Pacific highways, the centennial of the invention of the electro-magnet and to exemplify the development of hydro-electric energy.

**Union Paper Praises Mr. Arkwright.**—The *Union Leader*, under date of May 21, has reprinted an article which appeared in the ELECTRIC RAILWAY JOURNAL of April 23, entitled "Don't Hate Your Customers," by Preston S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga. The article is characterized as a common-sense talk made by the president of a progressive street railway. Further comment is made: "It is rare to find a railway president who has such a keen grasp of operating detail as to portray the importance of the occupation and the trials, difficulties and opportunities of motormen and conductors in the practical manner in which he presents them."

**Released From $1,000,000 Bond.**—The Dallas (Tex.) Railway has been released from its $1,000,000 improvement bond, made when it accepted the franchise in 1917 after extended negotiations between the city and the Strickland-Hobson interests. Release from this bond was voted by the City Commission on June 8 when it was shown by the company that it had carried out all pledges made in connection with the granting of the new franchise.

**Recommends Subway and Elevated Line.**—The annual report of Charles S. Butts, engineer of the Department of Public Utilities, St. Louis, proposes a subway for the Hodiamont line from Union Market to Spring Avenue with elevated tracks from Spring to Maple Avenue as a step toward the establishment of a better rapid transit system. In the opinion of the engineer the entire project would cost no more than $3,000,000. The report also suggests plans for the expeditious handling of passengers by the United Railways during the evening rush hours.

**Improvements Held Up in Seattle.**—In discussing the need of paving on certain business streets in Seattle, which has been held up on account of the necessity of new car tracks and rails, superintendent D. W. Henderson of the Municipal Railways said: "If the Municipal Railway had all the money that the jitney buses took from us in the last year, we would be able to pave First Avenue now. The jitneys are taking $300,000 or more a year from the railway revenues. If we had that money, the $325,000 First Avenue work could be financed.

**Jitney Petition Denied.**—The Public Utilities Commission of the State of Connecticut has denied the application of two operators to run automotive vehicles between Hartford and Manchester, a distance of 10 miles. The commission finds the existing transportation facilities of the trolley and steam road adequate to supply transportation requirements, except for about two peak hours each day, when auxiliary service would be a convenience. The applicant did not desire a certificate for this limited service. The commission prepared a lengthy decision covering the general controlling principles of competition, comfort, speed, general public requirements, permanency and continuity of service, etc. This is the first decision by the commission regarding public service motor vehicles to be made under the act of 1921 placing these vehicles under commission regulation.

# Financial and Corporate

## Importance of Adequate Junior Financing Urged

The bulletin of the Investment Bankers Association of America for May 28 contains the interim report of the subcommittee on electric securities presented by Lucien H. Tyng, vice-president of W. S. Barstow & Company, Inc., on the "Importance of Adequate Junior Financing." Mr. Tyng says that it has been found true of all classes of public service companies that too much of their financing has been done by sales of bonds.

A table which is included in the report prepared from figures by the *Commercial & Financial Chronicle* warrants, Mr. Tyng says, very careful study and consideration by everyone in the business of handling securities of public service companies. A company cannot create and sell bonds of the highest class unless a proper proportion of the financing is done by the sale of stock.

According to Mr. Tyng the best class of bonds should not exceed 60 per cent of the total value of the property of the company including intangibles, and it would be better for every class of security holders if the bonds were not in excess of 50 per cent of such value. This would leave 50 per cent to be raised by the sale of stocks which might be divided into 25 per cent preferred stock and 25 per cent common stock.

The interim report by Mr. Tyng is particularly significant in view of the discussion which was aroused at Chicago last February at the meeting of the American Electric Railway Association, at which financial topics were considered, among them "Present Mortgage Requirements," presented by F. K. Shrader of Halsey Stuart & Company, Chicago.

It is the opinion of Mr. Tyng that a determined effort is being made by all public utility managers at the present time to bring a number of the points made in his thesis constantly to the attention of the Public Service Commissions, so that the commissions will appreciate the necessity of companies being allowed to earn an amount sufficient to pay dividends that will encourage more stock investments.

He said that one reason why investment bankers had been reluctant to handle stocks is that in the past stocks were issued in excess of the amount of values represented. This, however, has not been so since the Public Service Commissions have had control of the situation and this question is removed entirely by the practice which has fortunately now been adopted in so many states, namely, issuing no-par stocks.

## Constitutionality of Revaluation Law Questioned

E. W. Bemis has been chosen to represent the City Council of St. Paul, Minn., as expert in the hearings before the Minnesota Railroad & Warehouse Commission upon the application of the St. Paul City Railway for increased fares, requiring a new valuation of the property. The cost for the expert testimony is to be added by the street railway to the cost on which fares are based.

In the case of the Minneapolis Street Railway, the Council has no idea of employing a revaluation expert now, although Robert M. Feustal, New York, submitted his credentials. The city legal department plans to contest the constitutionality of the revaluation law at the outset by a motion to have the proceedings before the commission dismissed on the ground that it has no jurisdiction. This will enable a quick appeal, or the city may continue to submit its testimony on the revaluation of the railway property under protest until the constitutionality of the law is passed upon by the courts.

## D. & H. Trolleys Do Not Meet the Cost of Service

According to the annual report of the Delaware & Hudson Company for the year ended Dec. 31, 1920, its four allied trolley lines failed collectively to meet the cost of service. All of the roads failed to earn anywhere near the same net income as during the previous year.

The report contains a review of the fare situation on each of its allied lines. The accompanying statement prepared from this review shows the actual condition of the financial operations for the year as compared with 1919.

EARNINGS OF DELAWARE & HUDSON ALLIED TROLLEY LINES

| | | Revenues All Sources | Operating Expenses | Net Operating Revenue | Taxes | Net Operating Income |
|---|---|---|---|---|---|---|
| United Traction Co., Albany, | 1920 | $3,253,973 | $3,149,206 | $104,767 | $217,816 | *$113,049* |
| | 1919 | 2,848,871 | 2,525,880 | 312,991 | 208,252 | 104,739 |
| Per cent change | | 14.22 | 24.18 | *3.67* | 4.59 | *207.2* |
| Hudson Valley Railway, | 1920 | 1,099,072 | 986,998 | 112,074 | 55,025 | 57,049 |
| | 1919 | 971,426 | 815,903 | 155,523 | 51,531 | 103,992 |
| Per cent change | | 13.14 | 20.97 | *2.98* | 6.78 | *54.11* |
| Plattsburgh Traction Co., | 1920 | 33,122 | 29,625 | 3,497 | 1,783 | 1,714 |
| | 1919 | 37,991 | 26,349 | 11,642 | 1,870 | 9,772 |
| Per cent change | | *12.29* | 12.43 | *70.00* | *4.65* | *82.46* |
| Troy & New England Ry., | 1920 | 39,442 | 44,397 | *4,955* | 1,870 | *6,825* |
| | 1919 | 36,429 | 35,589 | 840 | 1,550 | *710* |
| Per cent change | | 8.27 | 24.72 | *690.00* | 20.62 | *86.20* |

Italics denote decrease.

## Seattle $987,568 Behind

### City Still Struggling With Problem of Meeting Interest and Debt Amortization Charges

According to figures contained in the memorandum financial statement of the city of Seattle, as of June 1, 1921, submitted by City Comptroller Harry W. Carroll, the municipal railway lines operated for the year at a total loss of $987,568. The total operating expenses of the system are placed at $4,908,122, to which are added depreciation amounting to $677,178, and deductions from the gross income of $865,660, covering interest on general and revenue bonds, amortization of discount on revenue bonds and miscellaneous interest, bringing the grand total of expenses to $6,450,960.

Operating revenues are given as $5,410,764, of which amount $5,283,658 was derived from passenger car service. Miscellaneous revenues are placed at $52,628, bringing the grand total of all revenues to $5,463,392, this leaving a total net loss for the year of $987,568.

In the profit and loss account, aside from the net loss above quoted, are losses of $3,559 caused by minor adjustments, expenses, charges, etc., and losses of $256,670 caused by delayed losses which accrued in prior periods, the largest item in this category being $174,216 for losses on ways and structures retired from service.

### ACCRUAL BASIS OF ACCOUNTING

Establishing a system of setting aside each month's share of the bond interest and redemption charges accruing, the City Council utilities committee finds that the municipal railway must make up $425,625 for these two items. Against these charges, the railway had $218,740 cash balance on hand, after deducting outstanding warrants, leaving $206,884 to be made up.

The next interest payment on the $15,000,000 of bonds taken by Stone & Webster in payment of the lines is due on Sept. 1, but the money should be set aside in August to permit of its delivery in New York by that date, according to Chairman Erickson. The first redemption installment on the $15,000,000 bonds paid as the purchase price of the Stone & Webster lines will be due next March 1, the sum $833,000 likewise to be set aside thirty days earlier. Chairman Erickson said:

> The amount of interest charges accrued is $213,208, and as the cash on hand exceeds that total we expect to have the interest money on hand in ample time to meet the Sept. 1 installment. Whether we will be able to make up the next eight months the $212,416 accrued for redemption, but not set aside, is still uncertain. We may be able to do it without going on a warrant basis, as we did last February, when we set aside all receipts until we had enough to meet the interest charges.

**New Issue of Bonds Offered.**—Coffin & Burr, Inc., Boston, Mass., are offering at 84¾ and interest to yield 7¼ per cent $2,500,000 first mortgage lien and refunding gold bonds of the Alabama Power Company, Birmingham, Ala. The notes are dated June 1, 1921, and are due June 1, 1951.

# Answers to Accounting Questions

## Final Installment of Questions and Tentative Answers Under the Uniform System of Accounts for Electric Railways

The final installment of the tentative answers to questions raised in connection with the uniform system of accounts, prescribed by the Interstate Commerce Commission, recently made public, appears in this issue. These answers have been approved by the Committee on Standard Classification of Accounts of the American Electric Railway Accountants' Association, but as they have not received the formal approval of the Interstate Commerce Commission it should be understood that the decisions do not represent its final conclusions and that they are subject to such revision as may be thought proper before final promulgation in the accounting bulletins of the commission.

THE case numbers covered below are from A-616 to A-626, and from B-102 to B-109, with certain omissions. The omitted numbers represent cases which either are not of sufficient importance to justify publication or involve questions upon which a definite conclusion has not been reached.

*Q.* (*A*-616). To what account should be charged the value of material lost in transit between a storeroom and a power plant, or between a station and the storeroom?

*A.* Loss of company material while in transit on carrier's own line is chargeable to account 77, "Loss and damage."

*Q.* (*A*-617). An employee whose pay is chargeable to account 63, "Superintendence of transportation," uses his own automobile in performance of his duties, the carrier assuming the cost of repairs and supplies for operation. To what accounts should these expenses be charged?

*A.* The cost of repairs assumed by the carrier shall be charged to account 38, "Vehicles and horses," and the cost of supplies to account 96, "Garage and stable expenses."

*Q.* (*A*-619, b) Postal letter carriers are transported on basis of a monthly rate fixed by contract with postal authorities. To what revenue account should the receipts be credited?

*A.* To account 101. "Passenger revenue."

*Q.* (*A*-620, a). The franchise of a street railway company requires it to keep in good order and repair the paving between and adjoining its rails. The municipality bore the cost of the original paving, and the railway company carries nothing in its property accounts with respect to such cost. The municipality later replaced the paving with an improved kind, and charged the railway company the cost of the improved paving in the paving strip. What is the proper accounting?

*A.* In the absence of a reserve to provide for replacement such portion of the cost of the new pavement as may properly be considered as applicable to the betterment should be charged to road and equipment account 511, "Paving," and the remainder, including the cost of removing the old paving to account 10, "Paving," in operating expenses. (See Cases 42 and 194 of Accounting Bulletin 14.)

*Q.* (A-620, b). The purchase price of a street railway property, including its unexpired franchise, exceeds the appraised value of the physical property. The original franchise was free. What is the proper accounting for the excess payment?

*A.* The entire amount paid shall be charged to road and equipment account 527, "Cost of road purchased," for distribution as provided in the text of that account. In the distribution the amount paid in excess of the appraised value of the physical property shall be included in account 545, "Franchises," if the franchise may be regarded as the consideration for the excess payment and has an unexpired life of more than a year; and shall be amortized by monthly charges to account 91, "Amortization of franchises," as provided in the text of that account. Otherwise, the full amount of purchase price shall be distributed to the appropriate primary road and equipment accounts exclusive of account 545.

*Q.* (*A*-620, c). A street railway company incidentally furnishes steam power to an ice plant, charging therefor the estimated actual cost of fuel, water and labor and an arbitrary amount for use of boiler. What is the proper accounting for revenues and expenses?

*A.* The amounts received shall be credited to revenue account 118, "Power." The expenses shall be allowed to remain in the operating expense accounts appropriate for the carrier's own operations.

*Q.* (*A*-621). To what account should be charged the cost of testing meters used for measuring electric power furnished by a power company to the carrier's substation? These meters are owned two-thirds by the carrier and one-third by the power company.

*A.* Assuming that the carrier's proportion of the cost of the meters is carried in account 543, "Substation equipment," the expense of testing shall be charged to account 48, "Substation equipment."

*Q.* (*A*-622). Amounts billed against a carrier for work performed include cost of employees liability insurance. To what account should the payments be charged?

*A.* If the cost of work is chargeable to operating expenses, the insurance premiums paid shall be charged to account 93, "Insurance." (See Case 393, Accounting Bulletin 14.)

*Q.* (*A*-623). A carrier sells for $390 certain poles which were charged to the property account at $400, and with respect to which there is $40 in the reserve for depreciation. To what account should be credited the $30 representing the difference between the sale price and the ledger value less accrued depreciation?

*A.* The adjustment of the estimated depreciation previously charged to operating expenses and the actual depreciation as determined at the time of retirement shall be included in the account in operating expenses appropriate for the cost of repairs to the property before retirement, which, in this case, is account 20, "Poles and fixtures."

*Q.* (*A*-625). To what account should be charged the pay of section men for time used in cleaning and sanding stock cars?

*A.* To account 67, "Miscellaneous car-service expenses."

*Q.* (*A*-626). To what account should be charged amounts paid to employees for personal property damage while on duty such as the breaking of eye glasses, the damaging of uniform, etc.?

*A.* To account 92, "Injuries and damages."

*Q.* (*B*-102). To what account should be charged the cost of rubber boots carried on wrecking tool car as a part of service equipment?

*A.* To account 78, "Other transportation expenses."

*Q.* (*B*-103-1). A carrier is reimbursed by a realty company for the cost of grading a street. What is the accounting?

*A.* The entire cost of the grading shall be charged to account 504, "Grading." The amount contributed by the realty company shall be credited to account 305, "Donations."

*Q.* (*B*-103-6). A carrier changing from the cable system to the overhead trolley system, and from narrow to standard gage track, removes a portion of the cable system. How should it account for the cost of removing the cable structure, and for the cost of the new tracks?

*A.* The book value of the portions of cable railway removed shall be credited to the appropriate road and equipment accounts and charged, less salvage, to the appropriate operating expense accounts. The cost of removing such cable railway parts shall also be charged to operating expenses. The cost of installing the electric railway track shall be charged to the appropriate road and equipment accounts.

*Q.* (*B*-106). To what account should be charged the cost of handling sand for use in sand boxes of motor cars?

*A.* To account 11, "Cleaning and sanding track."

*Q.* (*B*-107). To what account should be charged payments to a contractor for removing ashes from power station boiler room during a scarcity of regular help?

*A.* To account 52, "Power plant employees."

*Q.* (*B*-109). To what account should be charged expense of maintaining small portable buildings used by flagmen at grade crossings?

*A.* To account 24, "Buildings, fixtures and grounds."

### Interurban Merger Rumored

A consolidation of the Charleston-Dunbar Traction Company and the Charleston (W. Va.) Interurban Railroad may result from the sale of the Dunbar line to Isaac Lowenstein. Mr. Lowenstein purchased the road for other parties.

Fred M. Staunton, vice-president of the Charleston Interurban Railroad, said that negotiations are pending regarding the future of the Dunbar line, but was not prepared to admit that any definite plans have been consummated. Former Governor W. A. MacCorkle, president of the Charleston Interurban Railroad, said that he was not in a position to give any information concerning plans for the merger.

Mr. Lowenstein, the purchaser of the Dunbar line, is president of the Charleston National Bank. He took over the property from Fred. Paul Grosscup, candidate for the Republican nomination for Governor in the last primary election. The deal is said to have involved $400,000.

### Roads at Providence Sold at Foreclosure

The properties of the United Traction & Electric Company, Providence, R. I., were sold under foreclosure at Providence on June 24. The roads included were the Union Railroad, the Pawtucket Street Railway, the Rhode Island Railway, the Pawtuxet Valley Street Railway and the Cumberland Street Railway.

They were bid in by Charles H. W. Mandeville, secretary of the joint reorganization committee, which has in its hands practically all of the outstanding securities of the companies liquidated. It is expected that the joint reorganization committee consisting of Colonel Samuel P. Colt, Stephen O. Metcalfe and Michael F. Dooley will assign the roads to the United Electric Railways as the successor company and that the owners of the stocks and bonds of the companies going into the reorganization will receive in exchange the securities of the United Electric Railways in accordance with the reorganization plan referred to at length in the ELECTRIC RAILWAY JOURNAL for Feb. 19, 1921, page 381.

### Utilities Oppose Depreciation Reserve Fund

The proposal of the Corporation Commission of Oklahoma to require all public service corporations in the State to set aside a depreciation reserve fund met with united opposition from the owners and managers of public utilities, at a hearing before the commission on June 21. The commission reserved decision.

The hearing was on proposed order No. 168 to compel each utility and other public service corporation to set aside a cash fund to cover depreciation of its property and prohibit it from paying out in excess of 6 per cent dividends until this depreciation reserve fund was created.

The utility operators expressed themselves as in favor of regulation of their rates and matters affecting their service to the public, but declared unanimously that if a corporation commission or any other governmental body were empowered to direct the management of the company or to tie up its funds in such a manner as they could not be used in the business, they would be unable to finance a single improvement.

The testimony of John W. Shartel, vice-president and general manager of the Oklahoma Railway, the largest electric railway system in the State, was typical. He said that his company has not been able to declare dividends for several years but has used all its surplus and net earnings in taking care of depreciation of the property and in putting in new improvements.

In the opinion of Mr. Shartel the proposed order would probably tie up about $200,000 of the funds of his company which otherwise would be put back into the property for improvement. He also declared that when he went to borrow money to build or extend interurbans or improve his city lines the banker would flatly refuse to make the loans.

### Interest Payment Planned

Frank Hedley, president and general manager of the Interborough Rapid Transit Company, New York, N. Y., announced on June 27 that the company would be able to pay the interest on the Interborough Rapid Transit 5 per cent bonds and the rental on the Manhattan Railway, both due July 1, provided earnings are maintained on a fairly normal basis.

## Financial News Notes

**Public Service Net Increases in May.**—The Public Service Railway, Newark, N. J., reports a net income of $65,816 for May, 1921, compared with $55,099 for May 1920. There were 38,456,479 passengers carried during the month. Of this number 31,285,489 were revenue passengers and 7,170,990 were transfer passengers.

**Interborough $189,152 Behind.**—The Interborough Rapid Transit Company, New York, N. Y., failed by $189,152 during May, 1921, to meet the cost of service. In May a year ago the company showed a surplus of $26,152. The net corporate deficit for the eleven months ended May 31 is $3,997,003 against a deficit of $1,953,664 for the same period of 1920 and compares with the twelve months' deficit of June, 1919, which was $3,810,340.

**Service Discontinued.**—The Eastern Massachusetts Street Railway suspended service on June 13 on the Woburn-Billerica line in accordance with a notice given out that jitney service would have to be withdrawn if operation of cars was to continue. The railway has provided for the needs of school children. The action of the company is not understood by the Mayor of Woburn, who stated that he had vetoed all jitney licenses in an effort to retain the railway service.

**Abandoned Line Runs Again.**—The Nassau Electric Railroad, a part of the Brooklyn Rapid Transit System, began operating the Ocean Avenue line on June 25 after a suspension of almost a year. The line runs between Bergen Street and Sheepshead Bay. Receiver Garrison has announced that the revenue would at least pay operating expenses from June 25 to Sept. 1, the vacation season when travel to the shore is heavy. The receiver reserves the right to discontinue service after Sept. 1.

**Carhouse Property Sold.**—The largest single piece of property in the downtown district of Long Beach, Cal., owned by the Pacific Electric Railway, was sold recently to H. E. Ware, a capitalist and investor of Long Beach for $125,000. The property, located on the northeast corner of American Avenue and Fifth Street, was used as a carhouse and freight depot by the railway.

**Refunding Proceeding Completed.**—Kidder, Peabody & Company, Boston, Mass., and Charles H. Dilman & Company, Inc., Portland, Me., recently offered for subscription at 100 and interest $600,000 of five-year collateral trust 8 per cent bonds of the Cumberland County Power & Light Company, Portland, which does the entire electric light, power and street railway business in Portland, Me., and vicinity. The new bonds are issued to retire $614,000 of 7 per cent notes which matured on June 1.

**Master Commissioner Appointed.**—Richard Swing, Cincinnati, was appointed master commissioner with increased authority to determine the assets and liabilities of the old Cincinnati & Columbus Traction Company by Judge Stanley C. Roettinger of the Hamilton County Common Pleas Court during the week ended June 11. Mr. Swing will determine what assessment, if any, should be levied against stockholders, who are said not to have paid in full for their stock. He was appointed in a similar capacity about a year ago, but lacked sufficient authority to probe deeply enough into the affairs of the company and Judge Roettinger's appointment gives Mr. Swing the necessary authority to take testimony from claimants and stockholders. When the old Cincinnati & Columbus Traction Company failed, one of the largest creditors was the Union Savings Bank & Trust Company, Cincinnati, a bondholder for $300,000. Stockholders of the company objected to the bank's claim.

# Traffic and Transportation

## Fare Five Cents

### Detroit Back to Old Rate, but Charges One Cent for Transfer—Temporary Arrangement

A new 5-cent rate of fare and 1 cent for transfer within the present one-fare zone went into effect on the Detroit (Mich.) United Lines on June 19. The City Council on recommendation of Mayor Couzens accepted the counter proposal made by the company after the city's plan of a 6-cent fare and ten tickets for 50 cents had been considered by the company and rejected.

In response to the Mayor's verbal request that the company begin to operate service in the one-fare zone on the fare schedule proposed by the city A. F. Edwards, vice-president of the Detroit United Railway, replied in a letter to the Mayor that the company did not believe the city's proposal would serve either the city's or the company's purpose. He stated that if the company is to try operation with a 5-cent paid fare, a 5-cent cash fare must be tried in place of the tickets suggested by the city. The proposal was made without prejudice to the rights of any or all parties and was subject to the one consideration that the company's and city's accountants should, with all due diligence, agree on a system of accounting acceptable to both parties. Under the agreement approved by the Council, the transfer charge will cover a transfer ride over the same routes as were previously in force.

### NO CHANGE IN GENERAL TRANSFER ARRANGEMENT

The very same transfer ride that could be obtained on the payment of a single fare will continue to be given for the 5-cent cash fare and the cent for a transfer. On the so-called double transfer routes the one transfer will serve the purpose. The 1-cent charge for transfers is not to apply on the so-called intermediate transfers, namely, where a person requires two transfers to reach his destination. In that case the charge is only 1 cent.

The new fare arrangement will not affect the city's attitude toward the redemption of rebate slips attached to strips of tickets sold by the company since June 9, 1920, according to Corporation Counsel Wilcox.

While the plan has not been in effect long enough to determine whether or not the company can operate successfully on a 5-cent fare, figures prepared by the city's auditors and presented to the Council show that the new fare rates will save about $1,000,000 a year for car riders and will give the Detroit United Railway about $180,000 more revenue than the city's proposal. It is stated that between 25 and 30 per cent of the riders now get transfers and will have to pay the 6-cent fare to ride to their destination. According to figures presented by the Mayor, the Detroit United Railway will earn approximately $200,000 a month above operating expenses under the new fare rate.

The agreement can be terminated at will by either party.

## Low Fare Experiment

### Cleveland Planning to Sell Two Tickets for Five Cents Good Down-town —Riding Off 11 per Cent

An experiment to determine whether an extremely low rate of fare will stimulate short haul car riders is to be made in Cleveland starting in July. The Cleveland Railway has asked the City Council to approve a plan for charging only a 2½-cent fare for riders in the down-town business sections of the city instead of 6 cents plus 1 cent for a transfer, which is the prevailing rate for the entire city.

The street railway committee of the City Council has already assented to the scheme as have also the directors of the railway. The City Council is expected to approve the change before it adjourns for its summer vacation.

The experiment is being attempted because ever since last December there has been a steady decline in the number of riders in Cleveland, until at present the reduction in the number of riders over last year amounts to 11 per cent.

The experiment is not a test of a zone system, railway officials point out, because it will merely take in the down-town section. As described by Paul Wilson, assistant secretary of the company, the experiment is being made for these reasons:

> We want to learn whether this low rate of fare will revive and increase the car riding habit of Cleveland; second, whether it will thereby increase our receipts, and third, whether it will aid in eliminating pedestrian congestion in the down-town section. We'd rather have jammed street cars than jammed sidewalks.

Under the new rate of fare for the down-town section, two tickets will be sold for a nickel or four for a dime. No transfers will be given in connection with these tickets. The easterly limit of the low fare zone will be East Twentieth Street, the southeasterly East Fourteenth Street, and the westerly limits the east approach of the new high level bridge. The territory covering the low fare zone is a little more than a square mile in extent.

Cleveland is admirably suited to the experiment, because town-bound cars, that is, those headed toward the Public Square, are pay-enters, while out-bound cars or those headed away from the Square, are pay-leave variety.

Operation of the lines in May was conducted at a net loss of $38,000 which caused a drop of $22,000 in the company's interest fund, the fare barometer.

Both John J. Stanley, president of the company, and Fielder Sanders, City Street Railway Commissioner, believe that the experiment may result in thousands of additional car riders daily in the territory affected.

## Eight Cents in Spokane

### City Commission Resents Ruling by State Body and Threatens to Turn Jitneys Loose

The Department of Public Works of the State of Washington on June 14 issued an order granting the request of the two Spokane railways, the Washington Water Power Company and the Spokane & Eastern Railway & Power Company for an increase in fares from 6 cents to 8 cents for a continuous one-way passage.

Immediately the city authorities who have been opposing the raise of rates proceeded to put into execution their threat that they would let loose the flood of jitneys which they have held in check for the last several years.

There is unquestionably a strong popular resentment against the railways seeking an advance now. However, an effort is being made to effect some sort of a compromise between the railways and the city.

On June 16 a delegation from the Chamber of Commerce protested before the City Commissioners against the return of the jitney to Spokane streets.

The trainmen retaliated by threatening not to run any cars. They were counseled, however, by the officers of their companies not to do anything that might further complicate matters.

The whole matter now rests on the efforts of the Spokane business men who are trying to bring about a settlement before the jitney situation reaches a condition which must be disastrous both from the standpoint of Spokane and that of the railways.

The Board of Public Works is a department of the state government under the new administrative code of the state which has succeeded the former Public Service Commission.

The following tabulation gives the income statement for the Washington Water Power Company for 1920, based on the fares in effect during that year, and at the proposed 8-cent fare had the proper charges been made for electrical energy used in operating cars:

| | Based on 6-cent fare 6-mill power | Based on 8-cent fare 12-mill power |
|---|---|---|
| Operating revenues (gross) .......... | $1,085,345 | $1,364,480 |
| Operating expenses.. | 699,419 | 789,904 |
| Depreciation (retirement expense).... | 152,955 | 152,955 |
| Taxes .............. | 78,814 | 78,814 |
| Total deductions from revenue .......... | $ 931,188 | $1,021,673 |
| Operating income (available for interest) ............ | 154,155 | 342,805 |
| Rate base ........... | 4,500,000 | 4,500,000 |
| Rate of return...... | 3.43% | 7.63% |

The commission says that the Washington Water Power Company has shown by the evidence to have actually lost money during 1916 and 1918 and to have earned less than 1 per cent in 1917 and to have earned approximately 3½ per cent in 1919 and 1920, and the Spokane & Eastern Railway & Power Company has actually lost money during all of these years.

The commission estimates that the 8-cent fare will enable the Spokane & Eastern Railway & Power Company to earn $113,605 more in the next twelve months than it earned in 1920, resulting in an allowance over operating expenses and taxes of $6,306 to apply toward its depreciation reserve, but providing nothing for interest upon its investment.

In disposing of the contention of the city that the roads should consolidate the commission said that a physical consolidation was possible and undoubtedly some saving in operating expenses could be accomplished thereby, but there are legal and financial reasons why a consolidation cannot be effected within such time as will avoid the increase of rates now necessary.

President Huntington of the Water Power Company said in part:

> If the Spokane public will read carefully the full text of the decision of the State Department of Public Works in the street railway fare case, we believe that it will not approve of the intention expressed by representatives of the city government of turning jitneys loose.
>
> We believe that the public wants efficient railway service and is willing to pay the reasonable cost of providing it. For years before the war, when cost of labor, material and taxes were far below present levels, the railways earned little more than the bare cost of keeping them going.
>
> The railway property of the Washington Water Power Company is one of the most economically operated properties of its kind in the country. No other property of its size in the country operates entirely with one-man cars. The saving from this practice alone is more than $300,000 a year. If we operated with two-man cars we should have had to ask the Department of Public Works for a 10-cent fare at least. The public benefits directly, and in large measure, by such economies, and the company is entitled to consideration for the efficiency it has shown.

## Six Cents in Knoxville

The Tennessee Railroad & Public Utilities Commission has issued an order allowing the Knoxville Railway & Light Company, Knoxville, Tenn., to charge a 6-cent fare effective July 3. The original application of the Knoxville Company was for a 7-cent fare and a 2-cent transfer charge. This was denied, the commission holding that the company had not set up sufficient reason for such an advance.

## Referendum Threatened in Cincinnati

Members of a citizens' committee have begun to circulate petitions in an effort to bring about a referendum election to prevent the recent railway ordinance passed by the Council of Cincinnati, Ohio, from going into effect. Under the amended ordinance, as passed by the City Council, the Cincinnati (Ohio) Traction Company is compelled to reduce fares one-half cent on Aug. 1. If the citizens' committee should obtain 10,000 signatures of voters to the petitions and file the petitions with the Board of Elections before July 14, the ordinance can not go into effect. The committee in explaining the motive for circulating the petitions said that the amended street railway ordinance did not insure any permanent lowering of the rates of fares.

## Emergency Rates Asked

### Minneapolis and St. Paul Railways Seek Temporary Increases Pending Final Adjustment of Valuation

The Minneapolis Street Railway and the St. Paul City Railway on June 22 filed with the Minnesota Railroad & Warehouse Commission applications for new valuations for the two lines. They were in printed form and covered details of finance and service.

In the case of Duluth an application already has been filed for an emergency increase in rate of fare from 5 to 7 cents and four tickets for 25 cents. The hearing was set for June 28 as to justification for the new rate. In the case of Minneapolis an existing ordinance permits the railway to increase its rate from 6 cents to 7 cents or four tickets for a quarter, or if it wants a higher rate it may go right to the state commission. In an application soon to be filed the St. Paul City Railway will ask an emergency rate of fare. The present ordinance there, allowing a 6-cent rate, which now prevails, does not contain any feature like the Minneapolis grant providing for an automatic increase.

In St. Paul taxes are being paid on about $16,000,000 of property and in Minneapolis a tax on about $21,000,000, which amounts do not include all items to enter into the valuation. The valuations to be obtained will be a basis for the permanent rate of fare. Experts will be retained by both cities, but the company will pay the bill in each case.

Inasmuch as thirty days is allowed before hearing on a petition it would be Aug. 1 before the emergency rate, if allowed, will take effect in St. Paul. At that time the 7-cent fare would be put in Minneapolis also, making the fares uniform in the two cities.

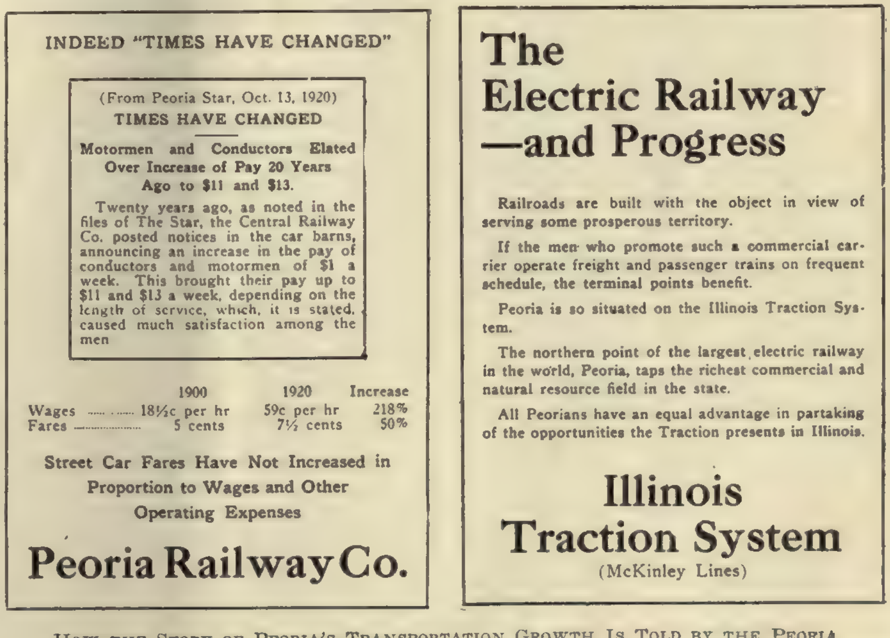
Except for an extension and construction now under way in Minneapolis the company expects to do no more work in 1921, notwithstanding $1,000,000 of intertrack paving and $600,000 more extensions have been ordered.

The companies desire the temporary rates to be effective until such time as the Railroad & Warehouse Commission may definitely determine the value of the property involved, at which time the company hopes that the commission will establish an equitable rate of fare assuring a reasonable return on the fair value of the properties.

It is pointed out that this is particularly important in view of the fact that both Minneapolis and St. Paul are asking for large capital expenditures, and until the commission has definitely fixed the value of the property it will be impossible to secure the needed money to make the improvements demanded. According to the Twin City Rapid Transit Company, which controls the Minneapolis and St. Paul lines, the one idea of the railway is to be placed in a position where it can furnish adequate service at cost and have its credit established so that it can secure the needed money to keep pace with these growing cities.

## Peoria Now and Twenty Years Ago

The story of Peoria's transportation growth and progress is told in the May issue of the *Peorian*, the official publication of the Peoria Association of Commerce. The old mule car was replaced in 1889 by the electric car which started the modern electric improvements on the Illinois Traction system. The accompanying announcements from the same publication give some important facts about Peoria in the twenty years of its development.



INDEED "TIMES HAVE CHANGED"

(From Peoria Star, Oct. 13, 1920)

TIMES HAVE CHANGED

**Motormen and Conductors Elated Over Increase of Pay 20 Years Ago to $11 and $13.**

Twenty years ago, as noted in the files of The Star, the Central Railway Co. posted notices in the car barns, announcing an increase in the pay of conductors and motormen of $1 a week. This brought their pay up to $11 and $13 a week, depending on the length of service, which, it is stated, caused much satisfaction among the men

| | 1900 | 1920 | Increase |
|---|---|---|---|
| Wages | 18½c per hr | 59c per hr | 218% |
| Fares | 5 cents | 7½ cents | 50% |

**Street Car Fares Have Not Increased in Proportion to Wages and Other Operating Expenses**

**Peoria Railway Co.**

**The Electric Railway —and Progress**

Railroads are built with the object in view of serving some prosperous territory.

If the men who promote such a commercial carrier operate freight and passenger trains on frequent schedule, the terminal points benefit.

Peoria is so situated on the Illinois Traction System.

The northern point of the largest electric railway in the world, Peoria, taps the richest commercial and natural resource field in the state.

All Peorians have an equal advantage in partaking of the opportunities the Traction presents in Illinois.

**Illinois Traction System**

(McKinley Lines)

HOW THE STORY OF PEORIA'S TRANSPORTATION GROWTH IS TOLD BY THE PEORIA CHAMBER OF COMMERCE

### Circuit Court of Appeals Sanctions Higher Fare

A recent decision in the United States Circuit Court of Appeals authorizes the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., to put into effect a 10-cent fare and further enjoins the Railroad Commission from interfering with the collection of that fare.

The company a few months ago applied to the commission to increase its fare from 7 cents to 10 cents. After the commission had denied the request the company instituted injunctions in the Federal Court. The case was heard by three judges. The principal contention of the railway was that a fair return upon the value of the property could not be made at the 7-cent rate of fare.

### Renews Petition for Increased Fare

The Carolina Power & Light Company, Raleigh, N. C., has renewed its petition before the Corporation Commission for an 8-cent cash fare with four tickets for 30 cents. At a recent hearing the company claimed $11,373 net earnings for the first four months of this year, which, it was stated, was insufficient to pay interest on bonds and dividend on a plant valued at $828,741. This case was continued from last January, when the commission ordered the city of Raleigh to show cause, on May 1, why the rate should not be advanced. The present rate is 7 cents, with four tickets for 25 cents.

### Commission Rules on Cumberland County Fares

Announcement was made by the State Public Utility Commission that the Bridgeton & Millville Traction Company, operating in Cumberland County, N. J., had been allowed an increase in fare, from 6 cents per zone to 7 cents per zone, in Bridgeton and between Bridgeton and Millville; 7 cents per zone on the Bridgeton-Port Norris line between Bridgeton and Newport. The board allowed a charge of 8 cents per zone on what was characterized as the "non-paying" part of the system, south of Newport, between Newport and Bivalve. The rate to school children may be increased to 1½ cents a mile by the company.

The freight rates allowed by the board were 25 cents for the first 100 lb. or fraction of this weight, and 10 cents for each additional 100 lb. Where $1.60 per ton is now charged by the concern, $1.80 per ton was allowed by the board.

**Wants Higher Fares.**—The Athens Railway & Electric Corporation, Athens, Ga., plans to petition the State Railroad Commission for a 10-cent fare. The present rate is 6 cents.

## Transportation News Notes

**Interurban Rates Advanced.** — The Pacific Northwest Traction Company has announced increased rates amounting to 4 cents on each commutation book ticket issued on its electric interurban line between Seattle and the Everett city limits. Only book rates are affected by the increase.

**Two-Cent Advance in Fares.**—The Corporation Commission of North Carolina recently permitted the Salisbury & Spencer Railway, operating in Concord, to increase its rates from 8 to 10 cents. The company is controlled by the North Carolina Public Service Company and would have had to abandon service had the commission refused the petition.

**Four Cents a Mile Authorized.**—Judge Louis FitzHenry, in the United States Court, has granted authority to the Galesburg & Kewanee Electric Railway, operating between Kewanee, Ill., and Galva, Ill., to increase its passenger fare to 4 cents a mile. The distance between the two cities is 8 miles and the fare is now 32 cents instead of 28 cents.

**Commission Orders Summer Rates.**—The Public Service Commission recently issued an order directing the United Railways & Electric Company, Baltimore, Md., to put into effect a single fare between city points and River View Park after 1 p.m. on Saturdays, Sundays and holidays and after 7 p.m. on other days. The ruling is to continue until Sept. 18.

**Seven-Cent Rate Continues.**—The Missouri Public Service Commission recently extended the 7-cent fare on the lines of the United Railways, St. Louis. The 7-cent rate was allowed some time ago and the time is extended until Dec. 31, 1921. This extension is permitted on the showing of the receivers' financial report for the first four months of this year.

**Bus Route Planned.**—Applications to operate motor buses have been filed with the California Railroad Commission by the San Francisco-Oakland Terminal Railways and the Napa-Soda Springs Bus Company. The key-route system is planning to operate a route from Fortieth Street, Oakland, to Montclair. The other route now being planned is between the cities of Napa and Soda Springs.

**A Privilege for the Blind.**—For the accommodation of the blind, Supt. Gaboury of the Montreal Tramways has given out notice that passes will be issued authorizing a blind person and his guide to ride for one fare. Accordingly, conductors will accept one cash fare in payment of passage of two such people. The pass will be printed in both the French and English languages.

**Hearing on Fare Matter Scheduled.**—Exceptions have been taken to the ruling filed recently by the Interstate Commerce Commission to the effect that the fare over the Daisy Line between Louisville and New Albany be reduced to 8 cents. The case will be argued before the entire Commission on July 14, and until that time the company will collect the regular 10-cent straight fare.

**Court Upholds Railway.** — Federal authority recently sustained the right of the Chicago, Ottawa & Peoria Railway, Ottawa, Ill., to charge 10 cents for rides within the city of Ottawa. This decision rules out the petition of the city asking the Federal court to prohibit the company from charging 10 cents for rides which start and terminate in the limits of Ottawa. The company is also permitted to charge 3.6 cents per mile for passenger traffic.

**Responsibility Fixed for Long Island Wreck.** — The Interstate Commerce Commission deals at length in its summary of accident investigation reports for January, February and March, 1921, with the side collision between two passenger trains on the electrified Atlantic Avenue branch of the Long Island Railroad, near Autumn Avenue. The accident occurred on Feb. 13. It resulted in the injury of twenty-three passengers and one employee. The commission says the accident was caused by the failure of a motorman properly to observe and be governed by signal indications.

**Anti One-Man Car Legislation Fails.**—Efforts at Tallahassee to legislate Tampa's one-man cars—and those in St. Petersburg and other cities too, for that matter—out of business were finally frustrated by the tacking on of an amendment to the second section which practically kills the bill as effectually as striking out the enacting clause. The amendment has stuck through the final two readings in the House, despite efforts to knock it off, and on the final reading the bill was passed and sent to the Senate, where it is confidently expected it will either die in committee or pass as it stands. The amendment exempts from provisions of the act those cars specifically designed for operation by one person and known as "one-man cars."

**Increased Rates Announced.**—Increased passenger fares have been announced by the management of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont. One-way fare has been advanced from 2.5 cents a mile to 2.75 cents a mile; round-trip fare from 2.25 cents a mile to 2.47 cents a mile; monthly commutation books from 0.81 cents a mile to 1 cent a mile. In commenting on these changes A. Eastman, vice-president and general manager, said: "Only that we have enjoyed a splendid patronage and that operating expenses have been kept down to the lowest possible point consistent with safety this company would not have been able to continue operation during the past three years."

# Personal Mention

## Journal Editor to Aid in Preparation of Business Paper Course

Henry H. Norris, managing editor of the ELECTRIC RAILWAY JOURNAL, has been delegated by the New York Business Publishers' Association to assist in the preparation of a course of instruction for present and prospective employees in the field of business papers. The association has contracted with the Business Training Corporation of New York City to administer this course and Mr. Norris' first duty will be to supervise the preparation of text material. In this work he will have the assistance of a co-operative group of from thirty to fifty leaders in the business papers field. In the fall groups of students will be organized among the several publishing organizations and these groups are to be led by experts in the publishing field with whom Mr. Norris will co-operate during the initial period of the work. This new work will not interfere with Mr. Norris' connection with the ELECTRIC RAILWAY JOURNAL except that it will require a portion of his time for a few months.

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**E. A. MacMillan,** formerly superintendent of the Stroudsburg (Pa.) Traction Company, and but recently returned from imprisonment in Soviet Russia, following his service with the British Railway Mission to Siberia, has been appointed assistant superintendent to the Atlantic City & Shore Railroad, Atlantic City, N. J.

**Edward T. Stotesbury,** who was long chairman of the board of the Philadelphia Rapid Transit Company, has accepted the chairmanship of the Committee on Finance of the Sesqui-Centennial Association of Philadelphia, to which he was recently appointed by Mayor Moore. His associates on the committee are: John Wanamaker, John H. Mason, Ellis A. Gimbel, and Mrs. Arthur H. Lea.

**Fred B. Johnson,** who recently retired from the Indiana Public Service Commission, has added his name to the list of those who, after severing their connections with the commission, immediately took up the practice of utility law. In an announcement Mr. Johnson states that although he will engage in a general practice he will specialize in utility matters. He states that in connection with Jesse I. Miller, of Washington, he will handle all matters before federal departments and bureaus in Washington, more particularly in connection with federal taxation questions.

**Frank B. Musser,** president of the Harrisburg (Pa.) Railways, is now in Edinburgh, Scotland, attending the convention of the International Rotary Club as the official delegate of his local club, of which he is vice-president. He sailed from this country on June 1. At the close of the convention he will take advantage of the opportunity to tour France and Belgium. His plans were to return to the United States about July 15. His friends among the railway men who attended the annual meeting of the Pennsylvania Street Railway Association, which met recently in Harrisburg, missed his joviality at the sessions. To remind him that he was not forgotten, the secretary of the association was instructed to cable him the greetings and best wishes of the members.

**John H. Moran,** general auditor of the Boston Elevated Railway, was called to Rochester, N. Y., recently in the capacity of adviser to the arbitration board, whose duty it was to settle the controversy between New York State Railways and its employees in Utica, Rochester, Syracuse and surrounding cities who are members of the Amalgamated Association. The arbitration board was composed of Judge Arthur Sutherland of Rochester, an impartial member; B. E. Tilton, vice-president of the company, and James H. Vahey, Amalgamated counsel, representing the company and the Amalgamated Association respectively. As announced on June 18 the arbitration board reduced the wages approximately 11⅓ per cent, with a maximum hourly rate for the trainmen of 53 cents.

**C. E. Davies** has been appointed by the American Society of Mechanical Engineers as managing editor of the society's publication to succeed the late L. G. French, who was both editor and manager. Mr. Davies was graduated from the Rensselaer Polytechnic Institute with the degree of M. E., and for several years afterward specialized in industrial management work. He became associated with the Smith-Premier works of the Remington Typewriter Company, Syracuse, N. Y., in 1914. During the war Mr. Davies was in the Ordinance Department at the Frankford Arsenal. Mr. Davies joined the editorial staff of the society in March, 1920, as associate editor of *Mechanical Engineering* and assistant secretary in charge of meetings and publicity. The society thus secured to assist on its publication and to help with its meetings one especially trained in large diversified business undertakings.

**R. M. MacLetchie,** comptroller of the Alabama Power Company, Birmingham, Ala., has recently taken over the duties of treasurer of the property formerly discharged by R. A. Mitchell, who was vice-president as well. As comptroller and treasurer Mr. MacLetchie will have complete supervision of all finances and accounting of the company.

**W. I. Boyer** has recently been appointed secretary and treasurer of the Hot Springs (Ark.) Railway. He is stepping into the place formerly occupied by W. E. Johnson.

# Obituary

**John I. Fistus,** who had been associated with the transportation department at the main office of the Pennsylvania-Ohio Electric Company in Youngstown, died on May 15.

**Joseph F. Devender,** for twenty-eight years in the employ of the Brooklyn (N. Y.) Rapid Transit Company, is dead. Mr. Devender served in many capacities with the company, ranging from helper to general foreman in the line department, which position he held at the time of his death.

**Michael J. Duffy,** a veteran of forty years' service with the street car lines of Boston, died suddenly at his home in Roxbury, Mass., April 28. Starting in as a conductor on the horse-car lines he rose through the ranks, until at the time of his death he was assistant superintendent of Division 2 of the Boston Elevated Railway. His funeral was attended by officials of the company and by several hundred fellow employees and friends.

**Will H. Bloss,** manager steam railroad sales of the Ohio Brass Company, Mansfield, Ohio, died at his home in Mansfield on June 22. Mr. Bloss was born on April 4, 1869. After receiving his engineering training at the Indiana University he started his career in railroad work. At one time he was division engineer on the Santa Fé Railroad and later he held a position as chief engineer of the Indiana Union Traction Company. He went to the Ohio Brass Company in November, 1906, from the Buda Company of Chicago and was district sales manager in some of the Central States until about a year ago. From that time he had devoted his effort to electrification development and other steam railroad problems.

**Lieutenant Daniel Sylvester,** head of the traffic squad of the San Francisco Police Department, died on May 16. He was recognized nationally as an authority on traffic matters and was elected president of the National Traffic Officers' Association which convened at the Civic Auditorium in San Francisco last August. The convention came to San Francisco as a result of his efforts. To Mr. Sylvester belongs credit for many of the nation's traffic laws and since taking charge of the San Francisco traffic squad he had accomplished more in that direction than any other one man. In an effort to stir up interest in the larger cities of the country in a national and uniform law governing traffic in all of the states of the nation, Mr. Sylvester toured the country last year and visited forty-eight cities.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES
BUSINESS ANNOUNCEMENTS

## Prompt Deliveries of Heavy Track and Shop Tools

### Prices Are Thought to Have Touched Bottom but Buying Continues Very Light

Excellent deliveries are quoted by manufacturers at the present time on heavy tools used on the roadbed and in shops, such as rail benders, rail saws, track drills, car movers, wheel presses, punches, shears, lathes, etc. Despite the present low level of production in this field producers are generally prepared to make immediate shipments on material that does not have to be made to specification. Where a product requires special manufacturing, work can be started as soon as orders are received, for back-order files have long since ceased to exist.

Substantial stocks of raw material are reported on hand which are gradually being made up into finished products of which a fairly large supply is also reported. Plants have either reduced their number of workmen or are running on part time, with operation ranging from about 25 to 40 per cent of capacity.

Manufacturers in this line apparently do not expect much improvement in business before the fall months. Lower labor costs may aid the steam railroad business somewhat as this class of buying has been even proportionately worse than electric railway demand. Steam roads have been so cramped financially, manufacturers state, that their buying of shop and track tools has been almost nil, whereas some of the electric roads have purchased up to about 25 per cent of their normal requirements.

Prices on track material such as rail saws, rail benders, track gages and levels, car replacers, etc., are said to have dropped about 20 per cent since the first of the year and are about 40 per cent below peak prices. Quotations on standard heavy shop products are down from about 10 to 20 per cent since the first of the year, and on special products selling prices are about 20 per cent below last year's quotations. The general view of manufacturers is that prices have about reached their bottom level.

## Market for Car Ventilators Not Very Active

Demand for car ventilators is light—in line with slack buying of new rolling stock on the part of electric railways. The outlook for future business is said to be fairly good, but not much hope of a reaction from the present dullness is held out before this fall. One of the newcomers among manufacturers of railway ventilating equipment reports that because of the present condition of railroad buying the company has drifted into the building ventilation line, where its product is equally applicable and is meeting with good success.

Stocks in some instances are not carried where ventilators are a special product, but in others a fair surplus supply is held. Deliveries are generally very prompt although production is down to about 50 per cent of capacity. Working forces have been cut in half in some instances, too. Prices in this field were not advanced in line with many other products, it is stated, and therefore quotations at present are only about 5 to 10 per cent lower than last year.

## Quiet Market for Car Seats

### Demand for Repair Seatings Is Inactive, Too—Rattan Prices Down 25 to 30 per Cent

Activity in the car seat market at present is confined to the production of old orders and little else. Buying of new seats is very light; there has been some business emanating from St. Louis, Detroit and Canada in line with buying of cars there, but the general situation is dull. Even the repair market is inactive and producers are well stocked with rattan material as a result.

At this same time last year there was about six times as much business going through as there is at present, one producer reports. Steam railroads are not placing orders either, the export market is lifeless, and the motor-bus seat trade, which started to come to the front rapidly, has fallen way off. Some hope is placed in the inauguration of lower labor costs on steam roads as the turning point for better demand from that quarter. In this connection the item of high labor cost is probably the one factor that shows up the electric railway market more than any other, it is stated.

Production of car seat manufacturers is down low because it follows actual buying pretty closely. Stocks of finished seats are not carried, but customers' requirements as to delivery can be well met at the present time. Orders are filled in from two to four weeks depending upon their size.

Prices have come down considerably, a large seat manufacturer dropping the price on rattan, for instance, about 20 per cent the first of June. This makes a total reduction of between 25 and 30 per cent from the peak on that product. Slat seats are said to be close to bottom because the lumber market is well down.

Leather has receded considerably too, but imitation leather has been coming to the front on the grounds of price.

## Railway Buying of Jacks Is Light

### Prices Are Down 20 to 25 per Cent and Production Is at One-Quarter of Capacity

Railway buying of lifting jacks has been limited this year, manufacturers report, and bids fair to remain so for the balance of 1921. Electric railways have purchased nothing at all in this line, some producers state, while others have received a small amount of business. Orders for the most part are not large individually and very often cover emergency requirements. Steam railroad buying has figured even to a less extent in the market. Unfavorable labor and financial conditions and the smaller volume of material to haul on transportation lines and in the automobile-truck field too have all aided in reducing sales of jacks. In general it is not expected that the balance of this year will record a very great increase in demand.

Prices on jacks used by railways are down from 20 to 25 per cent from the peak. This drop has been aided by a cut in wages amounting to 20 per cent in some instances. Raw material has also receded, in fact it is stated that this item is not expected to go enough below its present level to justify further lowering of prices. The main thing that would aid in bringing about additional lower costs on jacks, it is said, is greater production, for at the present time the industry is down to about 25 per cent of capacity operation. This decreased output of course entails bigger overhead expenses.

Raw material stocks in the field have been large in some cases but are being worked off without being replaced with new material, in view of present conditions. Fairly large stocks of the finished product are held in comparison with current buying, so that in general immediate shipments can be made. In view of the limited production, however, sudden orders for certain jacks occasionally exhaust the supply and then a delay of some weeks may occur before the stock is replenished.

## Strong Buying of Armature and Coil Winding Machines

### Their Increasing Use Accounted For by the Elimination of Stocking Several Different Types of Armatures

Good buying of armature and coil winding machines is reported at present. Demand seems to be well distributed and is coming not only from railways in this country but also in good volume from foreign countries. The basis of this business, the amount of which seems rather surprising in view of general market conditions, is said to be the desire of railways to lower costs through doing away with the need of stocking complete armature and field coils. In some instances it has been found necessary to stock a dozen or more different types of these where various motors are used. With the use of these machines only certain frames need be carried in stock as they can be made up as quickly as needed.

As this product is more or less of a specialty prices have not receded to any great extent, a drop of about 5 per cent from the peak having been made. Production is well up at present with deliveries being made promptly, or in about ten days to two weeks.

## Exports of Railway Material in First Quarter of 1921

Railway cars and parts with a total value of $15,073,000 rank twenty-third out of a list of the 100 chief exports of this country during the first quarter of 1921, according to the foreign commerce department of the U. S. Chamber of Commerce. Steel rails with a total value of $10,552,000 are thirty-first, railway switches, frogs, splice bars, etc., totaling $3,336,000, are seventy-first; bolts, nuts, rivets, etc., follow in seventy-fifth place with a valuation of $2,987,000; railroad ties are ninety-seventh with a value of $1,926,000, and electric switches, in ninety-eighth place with a value of $1,890,000, are the last railway item listed.

Comparison is also made on a few of the items that can be figured on a poundage basis, with the volume of exports in the first quarter of 1920. On this basis exports of steel rails increased from 28,529,000 lb. in the first three months of 1920 to 37,465,000 lb. in 1921, and bolts, nuts, etc., from 20,210,000 lb. to 30,937,000 lb. Likewise, exports of railroad ties in the first quarter jumped from a total of 700,000 ties in 1920 to 1,300,000 ties this year.

## Good Stocks of Car-Type Lightning Arresters

Lightning arrester sales, so far as the car-type are concerned, have been disappointing thus far, manufacturers report. This of course is a direct result of the light buying of new cars by electric railways. In anticipation of the usual seasonal volume of business in this line producers generally stocked up on car-type arresters, so that deliveries there are immediate. Central station buying is fairly good at present, however, though not up to the standard of last year, which was also below par.

On large types deliveries can be made in from two to eight weeks, the lower range being for arresters generally used and the longer delivery for highly special products. Stocks of the finished product on this type are not carried, but a good supply of parts is reported on hand ready to assemble. Prices are down 10 per cent, this drop being made earlier in the year.

## New Electric Railways in Japan

The Mushashi Electric Tramway Company, recently organized, according to the *Japan Advertiser*, will construct and operate a new electric railway from Tokyo to Yokohama, running approximately 1½ miles inland from the present railroad. The company will also furnish electricity to the villages along the route. Plans are being made, according to a translation from the Nagoya Shimbun, for the construction of a railroad between Nagoya and Yamada, a distance of 61 miles. Power is to be supplied by the Ibugawa Electric Power Company. Another line 30 miles long, around the Chita Peninsula, is planned by a company to be capitalized at 4,000,000 to 5,000,000 yen. A translation from the Osaka Mainichi Shimbun reports a project for the construction of an electric railway between Nagoya and Gifu. It is proposed to construct a double-track line paralleling the present steam railway, at a cost of about 7,000,000 yen.

## Rolling Stock

**The United Railways & Electric Company, Baltimore, Md.**, is expecting to buy twenty gasoline motor buses.

**Detroit (Mich.) Municipal Railway** is considering the use of trackless trolleys as feeders to be used in conjunction with the regulation municipal ownership cars. Specifications and prices for furnishing fifty of the new type cars will be asked. If bids sufficiently attractive to justify the purchase of the trackless cars are received by the commission that type of car will probably be used on some of the lines in the less congested districts. It is the belief of the commission that the cars can be manufactured in Detroit. The approximate cost is estimated at $7,000 each, and the maintenance is placed at 18 cents per mile as against 40 cents per mile for motor buses.

## Track and Roadway

**Indiana Service Corporation, Fort Wayne, Ind.**, owing to poor business conditions, has postponed for about a year building an extension to the proposed big truck plant which is to be erected just east of Fort Wayne, Ind., by the International Harvester Company. But the Greater Fort Wayne Development Company — a million dollar concern—which was formed among Fort Wayne business men to build homes, etc., is going ahead with plans already formed for putting in streets for the plant. One of the things which the development company is pushing right along is the extension of the car lines of the Indiana Service Corporation to the plant. Recently a remonstrance was filed by residents of Pontiac Street against the double tracking of that street, so another route to the plant east of the city is being considered.

**Seattle (Wash.) Municipal Railway** may resume work on an extension in East Marginal Way and First Avenue South, sus-

## NEW YORK METAL MARKET PRICES

| | June 1, 1921 | July 1, 1921 |
|---|---|---|
| Copper ingots, cents per lb | 13.25 | 12.87½-13.00 |
| Copper wire base, cents per lb | 15.00-15.25 | 15.00 -15.25 |
| Lead, cents per lb | 5.00 | 4.40 |
| Nickel, cents per lb | 41.00 | 41.00 |
| Zinc, cents per lb | 5.20 | 4.75 |
| Tin, cents per lb | 31.50 | 29.12½ |
| Aluminum, 98 to 99 per cent, cents per lb | 28.00 | 28.00 |

## OLD METAL PRICES—NEW YORK

| | June 1, 1921 | July 1, 1921 |
|---|---|---|
| Heavy copper, cents per lb | 10.75 to 11.00 | 9.50 to 10.00 |
| Light copper, cents per lb | 8.25 to 8.37½ | 7.25 to 7.50 |
| Heavy brass, cents per lb | 5 25 to 5 50 | 4.75 to 5.00 |
| Zinc, old scrap, cents per lb | 2.50 to 2.75 | 2.50 to 2.62½ |
| Yellow brass, cents per lb | 4.00 to 4.50 | 4.00 to 4.25 |
| Lead, heavy, cents per lb | 4.25 to 4.50 | 3.50 to 3.62½ |
| Steel car axles, Chicago, per net ton | 14.50 to 15.00 | 13.00 to 13.50 |
| Old car wheels, Chicago, per gross ton | 13.50 to 14.00 | 13.00 to 13.50 |
| Steel rails (short) Chicago, per gross ton. | 14.00 to 15.00 | 12.00 to 12.50 |
| Steel rails (rerolling), Chicago, gross ton | 13.50 to 14.00 | 13.00 to 13.50 |
| Machine shop turnings, Chicago, net ton. | 3.50 to 4.50 | 3.50 to 4.00 |

## ELECTRIC RAILWAY MATERIAL PRICES

| | June 1, 1921 | July 1, 1921 |
|---|---|---|
| Rubber-covered wire base, New York, cents per lb | 16.00 | 16.00 |
| Weatherproof wire base, New York, cents per lb | 15.50 | 15.00 |
| Standard Bessemer Steel Rails, per gross ton | 45.00 | 45 00 |
| Standard open hearth rails, per gross ton | 47.00 | 47 00 |
| T-rail, high (Shanghai), per gross ton, f.o.b. mill | ..... | ..... |
| Rails, girder (grooved), per gross ton, f.o.b. mill | ..... | ..... |
| Wire nails, Pittsburgh, cents per lb | 3.25 | 3.00 |
| Railroad spikes, drive, Pittsburgh base, cents per lb | 3.40 | 3.25 |
| Tie plates (flat type), cents per lb | 2.75 | 2.75 |
| Tie plates (brace type), cents per lb | 2 75 | 2.75 |
| Tie rods, Pittsburgh base, cents per lb | 5.50 | 5.50 |
| Fish plates, cents per lb | 2 75 | 2.75 |
| Angle bars, cents per lb | 2.75 | 2.75 |
| Rail bolts and nuts, Pittsburgh base, cents per lb | 4.50 | 4.50 |
| Steel bars, Pittsburgh, cents per lb | 2.10 | 2.10 |
| Sheet iron, black (24 gage), Pittsburgh, cents per lb | 3.85 | 3.60 |
| Sheet iron, galvanized (24 gage), Pittsburgh, cents per lb | 4.55 | 4.30 |
| Galvanized barbed wire, Pittsburgh, cents per lb | 4.10 | 3.65 |

| | June 1, 1921 | July 1, 1921 |
|---|---|---|
| Galvanized wire, ordinary, Pittsburgh, cents per lb | 3.70 | 3.25 |
| Car window glass (single strength), first three brackets, A quality, New York, discount* | 82% | 82% |
| Car window glass (single strength), first three brackets, B quality, New York, discount | 82% | 82% |
| Car window glass (double strength, all sizes, A quality), New York, discount | 83% | 83% |
| Waste, wool, cents per lb | 11 to 17 | 10 to 17 |
| Waste, cotton (100 lb. bale), cents per lb. | | |
| White | 9.00 to 14.00 | 8 50 to 11.00 |
| Colored | 6.50 to 12.00 | 6.00 to 8.50 |
| Asphalt, hot (150 tons minimum), per ton delivered | 33.00 to 35.00 | 33.00 to 35.00 |
| Asphalt, cold (150 tons minimum, pkgs. weighed in), per ton | 33.00 to 36.00 | 33.00 to 36.00 |
| Asphalt, filler, per ton | 36.00 | 36.00 |
| Cement, New York, per bbl | 3.20 | 3.20 |
| Linseed oil (raw, 5 bbl. lots), New York, per gal | .78 | .76 |
| Linseed oil (boiled, 5 bbl. lots), New York, per gal | .80 | .78 |
| White lead (100 lb. keg), New York, cents per lb | .13 | .13 |
| Turpentine (bbl. lots), New York, per gal. | .65 | .61 |

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* These prices are f.o.b. works, with boxing charges extra.

pended some time ago after expenditure of $27,000. This was forecast when Superintendent of Municipal Railways D. W. Henderson was asked by Oliver T. Erickson, chairman of the Council utilities committee, to furnish an estimate of cost of completing the work. The line would give a direct route for South Park cars, now routed through Georgetown.

**Utah Light & Traction Company, Salt Lake City, Utah,** as a result of a reduction in the wages of its employees now has at its disposal $125,000 for needed repairs to paved streets, track and for overhauling equipment.

## Power Houses, Shops and Buildings

**Union Traction Company, Anderson, Ind.,** lost a substation at Maxwell, Ind., by fire during a recent electrical storm.

**Connecticut Company, New Haven, Conn.,** will hereafter be furnished with power for the operation of its cars in Derby, Ansonia and Shelton from the Derby Gas & Electric Company. Formerly current was generated by the Connecticut Company's own plant in Shelton.

## Professional Note

**J. O. G. Gibbons** and **C. E. Brown** have formed a partnership under the name of Gibbons & Brown, consulting engineers specializing on power plants and industrial problems, with offices in the Ordway Building, Newark, N. J. Mr. Gibbons was formerly with Westinghouse, Church, Kerr & Company and is now engaged in private practice. For the past four years Mr. Brown has been a United States ordnance engineer.

## Trade Notes

**The Hi-Voltage Equipment Company, Cleveland, Ohio,** has developed a new type of lightning arrestor for outdoor mounting.

**The Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md.,** has recently placed on the market a portable electric grinder.

**The Walter Motor Truck Company, 227 West Sixty-first Street, New York City,** has developed a new line of electric road trucks of from 1,500 lb. to 7-ton capacity.

**The Independent Pneumatic Tool Company, Chicago, Ill.,** has put on the market the "Thor" electric drill stand for converting portable electric drills to drill presses.

**The Esterline-Angus Company, Indianapolis, Ind.,** has brought out a graphic alternating current ohm-meter for recording the resistance of liquids, the concentration of solutions, etc.

**The United States Steel Products Company,** which handles the export business of the U. S. Steel Corporation, has taken an order for $400,000 of steel rails it is stated, from the Toronto (Canada) Transportation Commission.

**The American Insulated Wire & Cable Company, Chicago,** manufacturer of "American Brand" weatherproof and bare copper wire and cables, contemplates building a rod mill when building conditions are more settled.

**The Benjamin Electric Manufacturing Company, Chicago,** has recently placed on the market its type RR threaded fixtures for heavy-duty service which are especially adapted for use in railroad shops and yards and large industrial plants.

**The Adapti Company, Cleveland, Ohio,** announces that it has purchased outright the property and buildings formerly occupied by the Cleveland Refrigerator Company at East Seventy-second Street and Oakwood Avenue, Cleveland, where operations will begin about July 15.

**The Whitman Electric Manufacturing Company, Whitman, Mass.,** has completed two new kilns of its own with large Sager capacity. The company is getting out a line of porcelain specialties—rosettes, receptacles, etc.—and is in a position to make shipments on special porcelain material.

**John A. Roebling's Sons Company, Trenton, N. J.,** is considering the construction of a new building for its copper wire and electrical galvanizing department. Plans at present are in a preliminary stage and no definite time is set for the completion of the work, the company announces.

**The Arrow Tool & Manufacturing Company** is the new name for the Arrow Tool Company, 200 Cannon Street, Bridgeport, Conn., manufacturer of tools of all descriptions. The company will continue as in the past to manufacture tools, dies and special machinery with no change in management.

**Belden Manufacturing Company, Chicago, Ill.,** manufacturer of electrical wires and cables, has issued bulletin No. 1, dated June 1, of the "Belden Bulletin." This bulletin will hereafter be issued to the trade monthly and will contain current net prices of the company's products. Bulletin No. 1 covers rubber-covered wires and lamp cords.

**Allis-Chalmers Manufacturing Company, Milwaukee, Wis.,** during the first three months of this year billed sales amounting to $7,656,218 as against $6,320,597 for the same period in 1920. Net profits after provision for federal taxes amounted to $774,189. Unfilled orders on hand March 31, 1921, aggregated $12,943,633, compared with $19,442,791 last year.

**The Safety Car Heating & Lighting Company, New York City,** held a meeting of its board of directors on June 15 at which time the following officers were elected: W. L. Conwell, president; J. A. Dixon, R. Parmly and James P. Soper, vice-presidents; C. W. Walton, secretary and treasurer; William Stewart, assistant secretary and assistant treasurer.

**The Industrial Protective Company, Dayton, Ohio,** of which W. R. McLean was president, was dissolved as of June 30, and the Dayton office discontinued. With H. A. Fishleigh, Mr. McLean has organized the Fishleigh-McLean Secret Service Bureau, with offices at 720 Nicholas Building, Toledo, Ohio, which firm will continue the services heretofore supplied by its predecessor.

**The Elliott Company, Jeanette, Pa.,** announces additions to its sales organization as follows: R. H. Schmidt has been assigned to the St. Louis district office, W. E. Widau to the Cleveland office and R. S. Bellman to the Philadelphia district office. In addition to the Elliott company's products they will also handle those of the Lagonda Manufacturing Company, Springfield, Ohio, and the Liberty Manufacturing Company, Pittsburgh.

**The International Register Company, Chicago, Ill.,** through its sales agent the Electric Service Supplies Company, has leased 112 International portable hand registers to the Third Avenue Railway Company, New York City. These registers are attached to the fare box and used as an additional check on fares. About 250 of them were also placed with the Public Service Railway Company, Newark, N. J., earlier this year, for use on its safety cars.

**Empire Engineering & Supply Company** about trebled its capacity for making switchboards and panelboards when it moved into its new factory at Twentieth Street and Fourth Avenue, Brooklyn, N. Y., in May. The new building is 100 ft. x 160 ft., only one story in height but so constructed that two or three stories may be added as needed. The company reports a satisfactory volume of business in these types of boards with the shops running almost full time.

**The Royal Indemnity Company, 84 William Street, New York City,** after having worked for some months on a form of policy for the insurance of electric motors, etc., early this year received approval from the insurance authorities in New York State of the form of a policy which would indemnify for the electrical and mechanical breakdown of motors, generators, transformers, regulators and other electrical apparatus. The company guarantees the repair bills directly incidental to such troubles.

**The Triumph Electric Company, Cincinnati,** manufacturer of motors and generators, announces the removal of its Chicago office from 628 West Lake Street to 2814-16 Wentworth Avenue, where it has more spacious quarters. W. R. Bonham is manager of this office. The company has also moved its New York office, of which T. W. Kloman is manager, from 80 Cortlandt Street to the Knickerbocker Building, Forty-second Street and Broadway. The Wood & Lane Company, St. Louis, representative of the company, is now established at 1016 Market Street, St. Louis, where it has large warehouse facilities and carries ample stocks of the various lines.

**The Stoker Manufacturers' Association** at its summer meetings, held in Stockbridge, Mass., June 14 to 16, elected the following officers: President, Maxwell Alpern, vice-president American Engineering Company, Philadelphia; vice-president, S. A. Armstrong, vice-president Underfeed Stoker Company of America, Detroit; treasurer, Richard D. Hatton, vice-president Laclede-Christy Company, St. Louis; secretary, J. G. Worker, vice-president Phoenix Manufacturing Company, Eau Claire, Wis. These officers, with the addition of R. Sanford Riley, retiring president, and A. G. Pratt, of Babcock & Wilcox Company, make up the executive committee.

**William Aldrich,** who has recently been in charge of the Southern territory of the Metal & Thermit Corporation, New York, has been transferred to its Western territory. From 1899 to 1908 Mr. Aldrich was associated intermittently with the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. In 1909 he joined the former Goldschmidt Thermit Company, since when he has traveled in every State in this country, also in Canada, West Indies, Central America, Panama and the tropics in the interest of Thermit. Mr. Aldrich will travel extensively in the far Western States and will make his headquarters at the new South San Francisco office of the Metal & Thermit Corporation. William H. Moore, who until recently was assigned to the Chicago territory, now has charge of the Southern territory.

**The Link-Belt Company, 910 South Michigan Avenue, Chicago,** according to an announcement made by Charles Piez, president, has acquired all of the capital stock of the H. W. Caldwell & Son Company. At the same time Frank C. Caldwell has been elected director of the Link-Belt Company. Thus two experienced companies in the conveyor field have joined forces, with the result that the Link-Belt Company has added two lines, "Hellicord" conveyors and power-transmission machinery, to its line of manufactures. While the plant of the H. W. Caldwell & Son Company will continue to operate under separate corporate existence and under its present name, the joint facilities of the two companies and the broader avenues of distribution possessed by the Link-Belt Company should prove of distinct advantage to the customers of both, says Mr. Piez. There will be no modification of the policies of the Caldwell plant, no impairment of its service and no change in its product. The plant management will remain substantially the same as at present.

## New Advertising Literature

**Unaflow Engines.**—Bulletin No. 29 recently issued by the Ridgway Dynamo & Engine Company, Ridgway, Pa., describes its unaflow engines.

**Steam Tables**—The Wheeler Condenser & Engineering Company, Carteret, N. J., has published the sixth edition of "Steam Tables for Condenser Work."

**Electric Glue Pot.**—"Glue Pot Service" is the title of a pamphlet issued by the Automatic Electric Heater Company, Warren, Pa., covering its electric glue pots.

**Mill-Type Motors.** — General Electric Company has issued bulletin No. 48121.1A, superseding bulletin No. 41821.1, entitled "Direct-Current Mill-Type Motors, type MD

**Alternating - Current Engine - Type Generators.**—This is the title of the fifteen-page, illustrated bulletin No. 1115 superseding No. 1098 issued by Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

**Electrical Porcelain.**—"Standard Electrical Porcelain is the title of a new catalog recently issued by the R. Thomas & Sons Company, East Liverpool, Ohio, covering its porcelain products.

**Wood Stave Pipe.**—The Redwood Manufacturers Company, Hobart Building, San Francisco, Cal., has issued catalog X, June 1921, "A Handbook of Information for Hydraulic Engineers Relating to Remco Redwood Pipe."

**Buffers and Grinders.**—The Valley Electric Company, 3157 South Kingshighway, St. Louis, Mo., has issued a circular describing and giving net trade prices on its complete line of portable electric buffers and grinders which it has just recently developed.

# PEACOCK ASKS—

*why limit safety equipment to new cars?*

## A man said to us—

*"Your business must be pretty limited when you can only sell new brakes for newly-built cars."*

He didn't know that

# Peacock Staffless Brakes

are going onto many a sturdy veteran car which has outlived the brakes originally installed on it. He didn't know that companies which are now converting two-man cars for really safe operation by one man are ripping out old hand brake equipment and installing Peacocks.

"The Peacock Staffless"

## Because—

They produce maximum braking in minimum time.
They produce maximum braking with minimum effort.
They are always dependable.
They save valuable platform space.
They cut down weight.
They are understood by every motorman.
They are approved by claim departments.

**NATIONAL BRAKE COMPANY**
**890 Ellicott Square**
**Buffalo, N. Y.**

# Bankers and Engineers

**Ford, Bacon & Davis**
115 BROADWAY, NEW YORK
Detailed Examinations by Experts
REPORTS FOR FINANCING COVERING
Valuation Turnover
Costs Reserves Rates
UTILITIES INDUSTRIALS SHIPPING

**STONE & WEBSTER**
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*Design and Construct*
STEAM POWER STATIONS
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INDUSTRIAL PLANTS GAS PLANTS
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**SANDERSON & PORTER**
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

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ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
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CONSULTING AND CONSTRUCTING ENGINEERS
*Valuations Reports Investigations*
*Designs Construction Management*
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CLEVELAND, OHIO YOUNGSTOWN, OHIO
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**C. E. SMITH & CO.**
*Consulting Engineers*
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Investigations, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Power Plants

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*Engineers—Constructors*
Industrial Plants, Buildings, Steam Power Plants, Water Powers, Gas Plants, Steam and Electric Railroads, Transmission Systems
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OPERATING, TRAFFIC AND RATE INVESTIGATIONS
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52 VANDERBILT AVE., NEW YORK

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CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
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Appraisals, Reports, Rates, Service Investigation, Studies on Financial and Physical Rehabilitation
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**HORTON, BARKER & WHEELER**
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Investigations, Reports, Design and Supervision of Construction for Power Development and Transmission; Dams, Reservoirs, Water Supply, Sewerage, Sewage disposal; Specialists in Public Utility Rates and Valuation.
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*Consultant*
FARES, BUSES, MOTOR TRUCKS
More revenue from *more* riders
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WM. BARCLAY PARSONS H. M. BRINCKERHOFF
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*Engineers—Constructors—Managers*
Hydro-electric Railway Light and Industrial Plants
Appraisals and Reports
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743 Hanna Bldg. 84 Pine St.

**Griffin Wheel Company**
McCormick Building
Chicago, Ill.

**GRIFFIN F. C. S. WHEELS**

**For Street and Interurban Railways**

**All of our plants have adequate facilities for fitting wheels to axles**

**FOUNDRIES:**
Chicago
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Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
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*Design, Construction*
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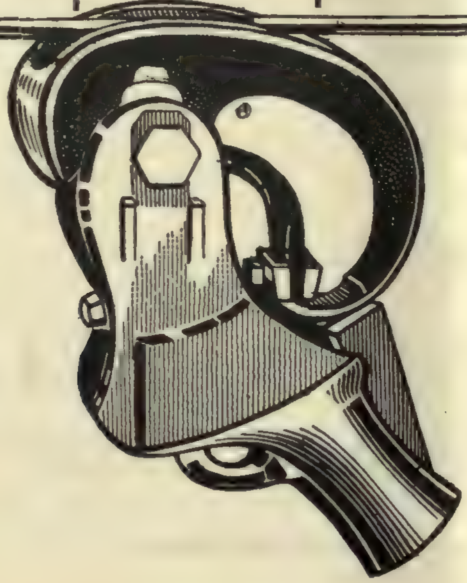
The Most Successful Men in the Electric Railway Industry read the

Every Week
ELECTRIC RAILWAY JOURNAL

**E. W. CLARK & CO. MANAGEMENT CORPORATION**
*Engineers*
Unit Power Plants insure low power costs
**Huntington Bank Bldg., Columbus, Ohio**

# The ←3"→ Contact



## There's Safety and Economy in Its Unshakeable Grip

You don't need to be told the costly results of mishaps, from trolley wheels leaving the wire, tearing down overhead, damaging car roofs, delaying service and even injuring passengers.

# The Miller Trolley Shoe

hugs the wire at a 60 mile clip—the 3-inch contact has no sensitive axis to bend or loosen. The Miller Trolley Shoe ends for all time the "chore" of constant lubrication.

Your motorman gets more power because of the greater contact surface. Your conductor is relieved from the constant necessities of replacing a "jumped-off" pole.

***It's to your advantage to hear the rest of the story.***

***Write us.***

## Miller Trolley Shoe Co., West Newton, Mass.

**SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago**

**EASTERN REPRESENTATIVE: National Railway Appliance Co., New York**

**SALES REPRESENTATIVES:**

Alfred Connor, Denver, Colo.
T. C. White & Co., St. Louis, Mo.
F. F. Bodler, San Francisco, Calif.
W. M. McClintock, St. Paul, Minn.
S. I. Wailes, Los Angeles, Calif.
W. F. McKenney, Portland, Oregon

# Hand Brake or Air Brake—You Want Your Pins and Bushings

# BOYERIZED

*When "the sum of the forces delivered to the brake-beams of the left-hand truck is equal to* 10,308 + 10,308 *lb.; that is,* 20,616 *lb., the sum of the forces delivered to the brake-beams of the right-hand truck is also known to be* 20,616 *lb."*

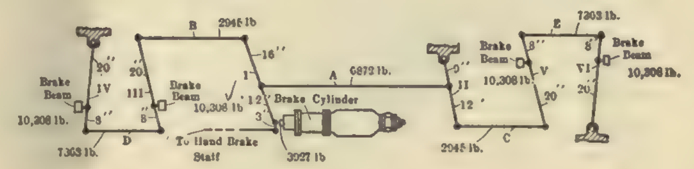


Fig.10

And so on continued Mr. H. M. P. Murphy in another of his excellent brake-rigging articles, this being from the April 16 "Determination of Forces on Eccentric Levers and Bell Cranks."

Now what about those little connectors in the brake rigging? The pins and bushings?

Are you sure that they will safely stand the tug and pull of these 20,000 lb. forces and more if made of nothing better than untreated or unequally treated steel?

**Wise operators — and most of them are wise — know that such forces are not to be trifled with for the sake of saving a few cents in maintenance with the chance of losing many dollars in shopping time and accident cost.**

That's why the mark of a "Safety Always" electric railway is Boyerized Pins and Bushings plus

**Boyerized Stag Brand Manganese Brake Heads**

**Brake Hangers**
**Brake Levers**
**Pedestal Gibs**
**Brake Fulcrums**
**Center Bearings**
**Side Bearings**
**Spring Post Bushings**
**Spring Posts**
**Bolster and Transom Chafing Plates**

## Bemis Car Truck Company

***Electric Railway Supplies***

**Springfield, Mass.**

**REPRESENTATIVES:**

D. L. Beaulieu, P. O. Box 3004, Boston, Mass.
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W. F. McKenney, 54 First Street, Portland, Oregon.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

*Kalanki*

The tenth incarnation of Buddha is yet to come, say the true believers. He will be called Kalanki and at some remote day will suddenly appear mounted on a white charger and will thence proceed to drive the wicked and the unpleasant out of the world and restore the Golden Age.

Very interesting.

No doubt the Volstead Act will be lifted out of the Constitution and given a vaudeville contract; perhaps the Blue Laws will be de-colorized and the old-fashioned non-cabbage Five-cent Cigar will come into its own once more.

Brush trouble?

That can be eliminated only by specialists. Buddha may be a whirlwind at demolishing the wicked, but when a commutator starts chettering it is time to send for a Morganite engineer. He will be able to guarantee you untroubled brush service.

The proof of his ability will not cost you a cent!

Morganite Brush Co., Inc.

**Main Office and Factory: 519 West 38th Street, New York**

DISTRICT ENGINEERS AND AGENTS:

Electric Power Equipment Corp., 13th and Wood Sts., Philadelphia

Electrical Engineering & Mfg. Co., 907-909 Penn Ave., Pittsburgh

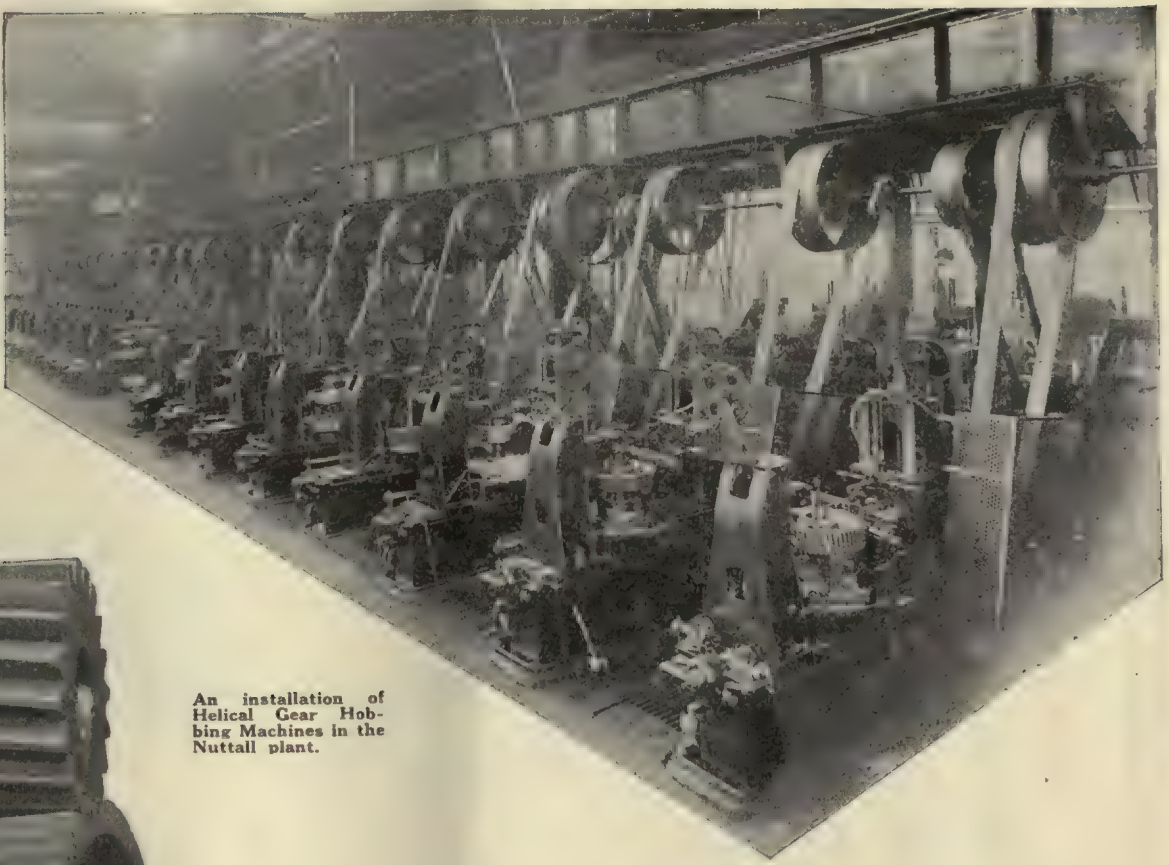
R. W. Lillie Corporation, 176 Federal Street, Boston, Mass.

W. R. Hendey Co., Hoge Bldg., Seattle

Herzog Electric & Engineering Co., 150 Steaurt St., San Francisco

Charles Farnham, I. W. Hellman Bldg., Los Angeles

Railway & Power Engineering Corporation, Ltd., 131 Eastern Ave., Toronto, Ontario, Canada



An installation of Helical Gear Hobbing Machines in the Nuttall plant.

Gear Vibration Costs Money

Vibration is a very destructive agent. It quickly destroys operating equipment, thus causing heavy maintenance expense.

Helical Gears, if properly designed and constructed, prevent vibration and noise.

The Nuttall Company has the distinction of having designed and made successful railway helical gears. This company's facilities for turning out A No. 1 helical gears are ample to meet any demand.

Above is shown a part of a large installation of special Nuttall Helical Gear Hobbers. More than 25,000 railway helical gears have been cut with these hobbers.

*Write for Bulletin No. 28.*

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

Nuttall

# "STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

*"The 'Standard' Brand on your material is an assurance of eventual economy."*

## STANDARD STEEL WORKS CO.

GENERAL OFFICES

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ST. LOUIS
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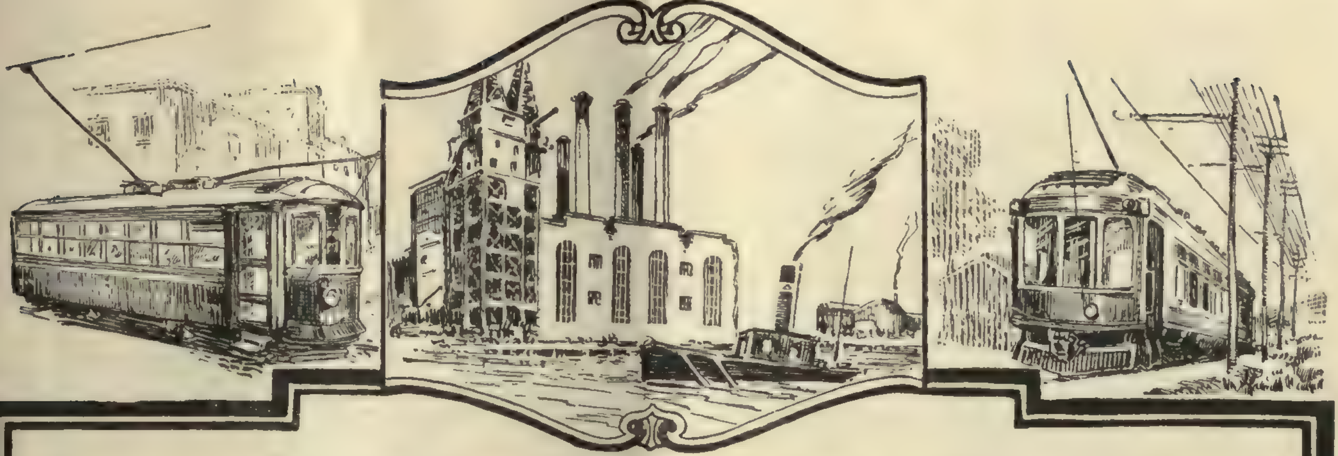
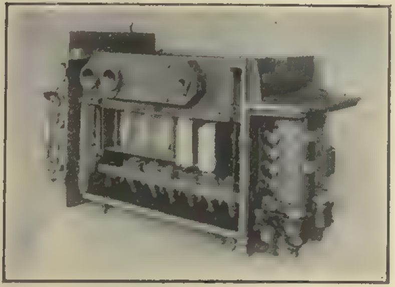
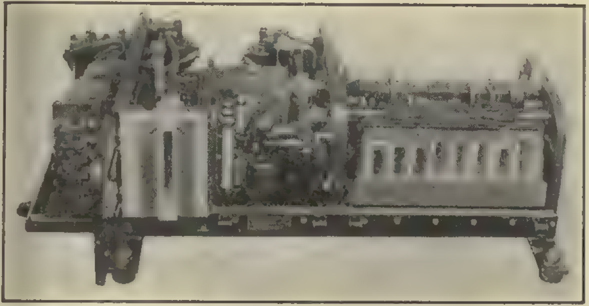
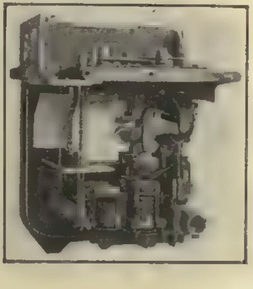
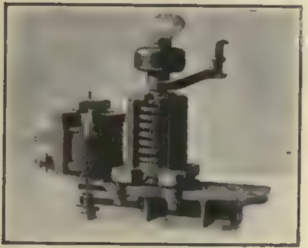










Why Texaco No. 921 Transmission Lubricant is so successful on the Westinghouse H L Control and the General Electric Magnetic Control:

1. Does not run off contacts in warm weather and leave them dry.
2. It is not so thick as to interfere with electrical contact.
3. It is not so thick in cold weather as to wipe off and fail to lubricate.
4. Decreases arcing. Prevents possibilities of fire from arcing.
5. Does not separate in cold or warm weather.
6. Does not form deposits.
7. Reduces short circuits through elimination of carbon deposits.
8. It is a Texaco Lubricant—which means that it is carefully refined, thoroughly tested for the work, and guaranteed by one of the world's leading refiners of Petroleum Products.
9. It is packed in 25-lb. handy screw top cans—clean and convenient.

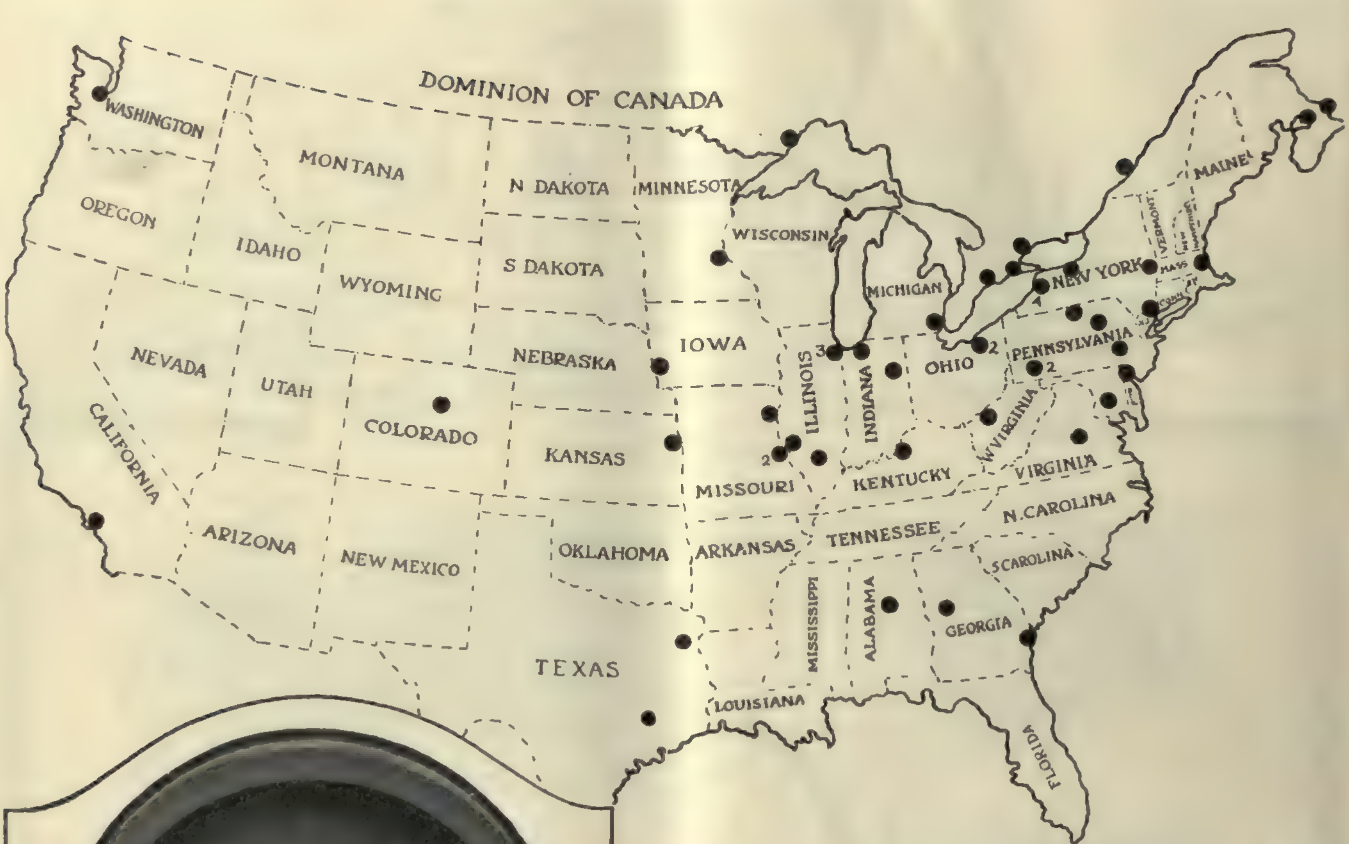
Texaco No. 921 Transmission Lubricant is one of the many Texaco Street Railway Lubricants which are meeting with such marked success on street railways all over the country.

*Ask us more about this Lubricant, or about any Lubricant for rolling stock, power plant, shop, any equipment whatsoever anywhere.*

***There is a Texaco Lubricant for every purpose.***

# THE TEXAS COMPANY

DEPT. ST. 17 BATTERY PLACE. NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES



**49** *The map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels*

Chicago 3
St Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City, Ind
Louisville
Mt Vernon, Ill
Ft. Wayne. Ind
Birmingham
Atlanta
Savannah

Boston
Detroit
St. Paul
Kansas City, Kan
Denver
Tacoma
Rochester, N.Y.
Sayre, Pa
Berwick, Pa.
Albany
Toronto
New Glasgow N.S
Madison, Ill.

Huntingdon W Va
Wilmington, Del
Houston, Tex
Hannibal Mo
Reading, Pa
Baltimore
Richmond, Va
Ft. William, Ont
St. Thomas,
Hamilton,
Ramapo, N.Y
Marshall, Tex
Los Angeles
Council Bluffs

AMERICAN RAILROAD ASSOCIATION STANDARDS

*650 lb. wheel for 60,000 Capacity Cars*
*700 lb. wheel for 80,000 Capacity Cars*
*750 lb. wheel for 100,000 Capacity Cars*
*850 lb. wheel for 140,000 Capacity Cars*

The Standard Wheel for Seventy Years

Where

**CHILLED IRON WHEELS**

*are made for Railway and Street Car Service.*

*Capacity 20,000 per day*
*25,000,000 in Service*

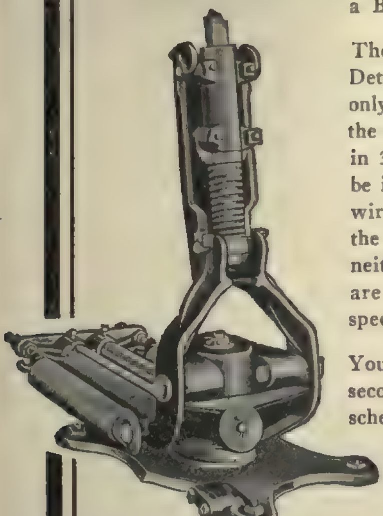
Association of Manufacturers of Chilled Car Wheels

*1847 Mc Cormick Bldg.*
CHICAGO

Consider the
Value of the
TIME SAVED
by
BAYONET
Trolley Equipment

**10**
**Seconds**

are all the time required to change a Bayonet Trolley Harp or Wheel, or substitute a Bayonet Sleet Cutter.

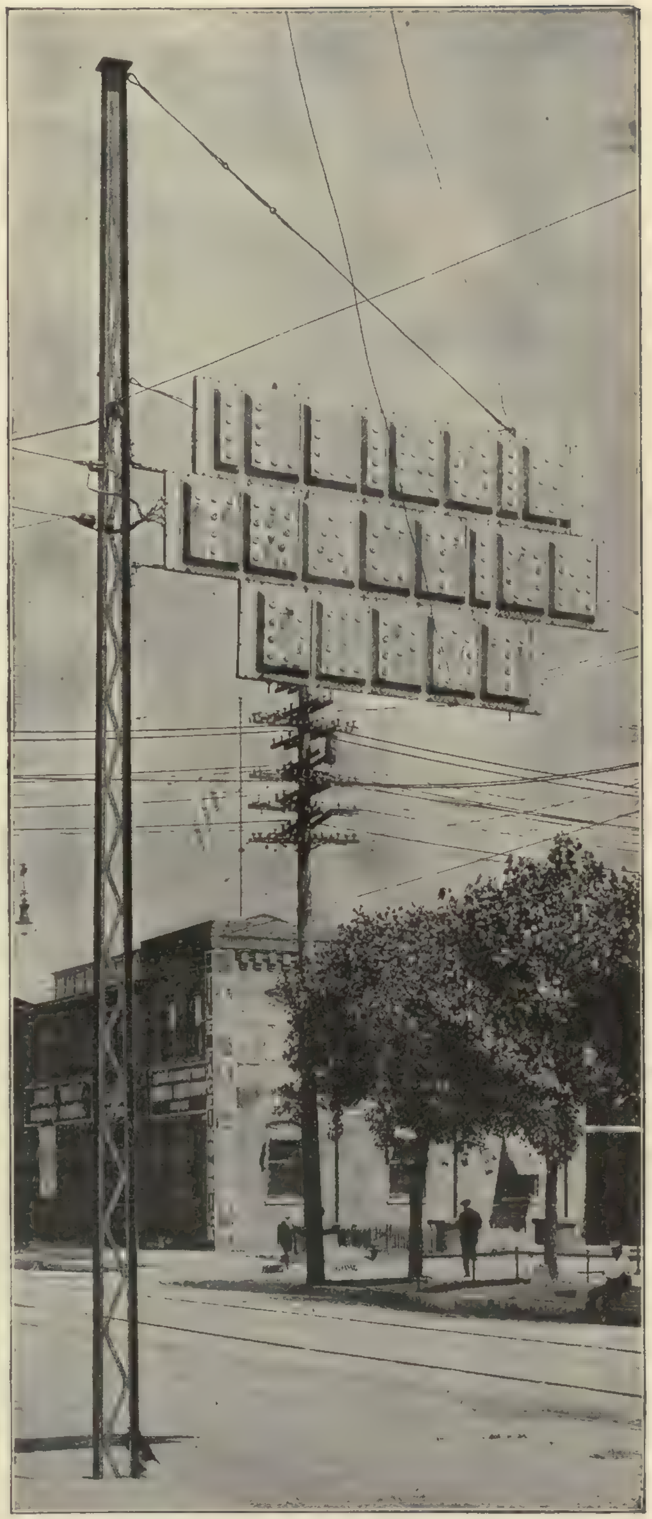


The Bayonet Trolley Base with Detachable Pole Clamp is the only trolley base made on which the trolley pole can be changed in 30 SECONDS and the wheel be in perfect alignment with the wire, no tools required to do the job. And remember that neither safety nor durability are in any way sacrificed for speed.

You know how valuable those seconds are when headway and schedules are to be maintained.

***Bayonet Equipment is sold subject to approval. It's the surest step you can take toward economy-plus-efficiency.***

**Bayonet Trolley Harp Co.**
**Springfield, Ohio**



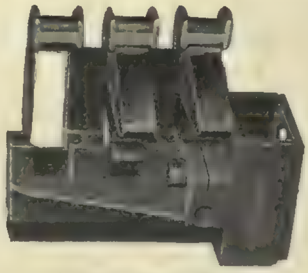
## Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

**Our New 1921 TREATISE AND HANDBOOK sent upon request.**

**Bates Expanded Steel Truss Co.**
**208 South La Salle Street**
**CHICAGO, ILLINOIS**



Lindall Brush Holder

Breaker

ANDERSON
*Specialties Serve and Save*

They are durable, economical to install and their quality has been proved by years of reliable service.

*Specify them.*

Albert & J. M. Anderson
Mfg. Company
289 A Street, Boston, Mass.

Trolley Wheel

Lightning Arrester

Anderson Crossover

Anderson Crossover

IRVINGTON INSULATION

Irvington products are thoroughly dependable. Years of constant service in every type of electrical machinery, and in insulated wires and cables have given conclusive proof of their ability to stand up under the most trying conditions.

Irvington Products are the result of 16 years of experience — they possess the greatest dielectric strength of any insulating materials ever produced.

Our increased facilities, including our new bleachery, enable us to give your orders prompt attention — at prices based on lower raw material costs.

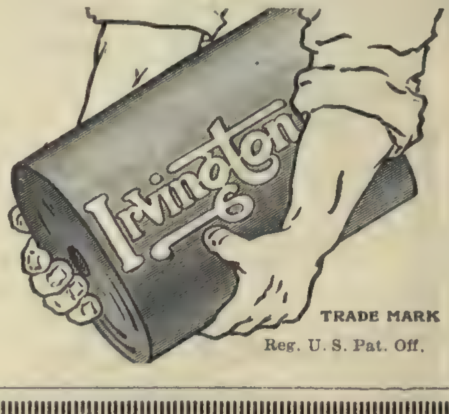
If you need insulating materials of any kind — insist on the best — Irvington and nothing less.

Ask for samples and prices.

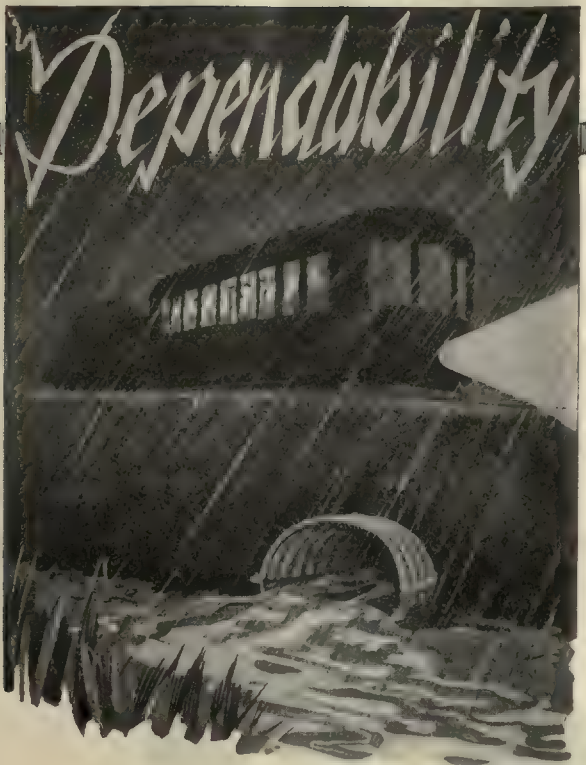
IRVINGTON VARNISH & INSULATOR Co.
Irvington, New Jersey.

*Established* 1905

*Distributors*
MITCHELL-RAND MFG. CO., New York City
L. L. FLEIG & CO., Chicago
ELECTRIC RAILWAY & MANUFACTURERS SUPPLY CO., San Francisco
T. C. WHITE ELECTRICAL SUPPLY CO., St. Louis
CONSUMERS RUBBER CO., Cleveland



TRADE MARK
Reg. U. S. Pat. Off.



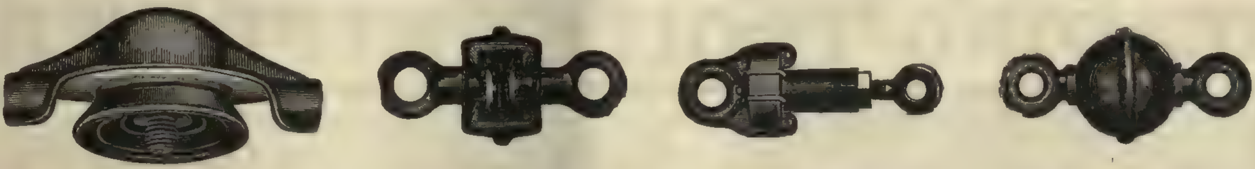
When lightning rips the sky, rain descends in heavy torrents and the floods come—then of all times you feel the need of dependable culverts, such as

**"ACME" (NESTABLE)**
**<TONCAN>**
**CORRUGATED METAL CULVERTS**

Made of heavy gauge Toncan Metal, "ACMES" possess both strength and long life. (Toncan Metal is anti-corrosive.) As evidence of "ACME" dependability we call attention to those installed in 1908. They have experienced the hardest summer storms and floods, not to mention the most severe winters. Yet they have given perfect service, every year, during the entire 13 years. That's not all. Because they show no signs of rust they are good for many more years of service. We leave it to you—isn't that real dependability!

*Write for delivered prices*

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.



You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

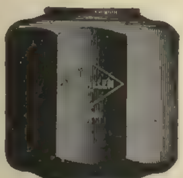
**The Macallen Line**

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

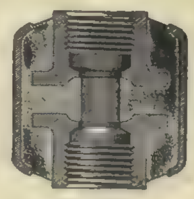
They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

**The Macallen Insulating Joint**



Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.



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**The Macallen Company**
Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK

We sell them in Missouri or in any other place where the buyer must be shown that—Hensley Guaranteed Trolley Wheels give better service at less cost.

*Write for details and revised prices*

**Hensley Trolley & Mfg. Co.**
Detroit, Mich.

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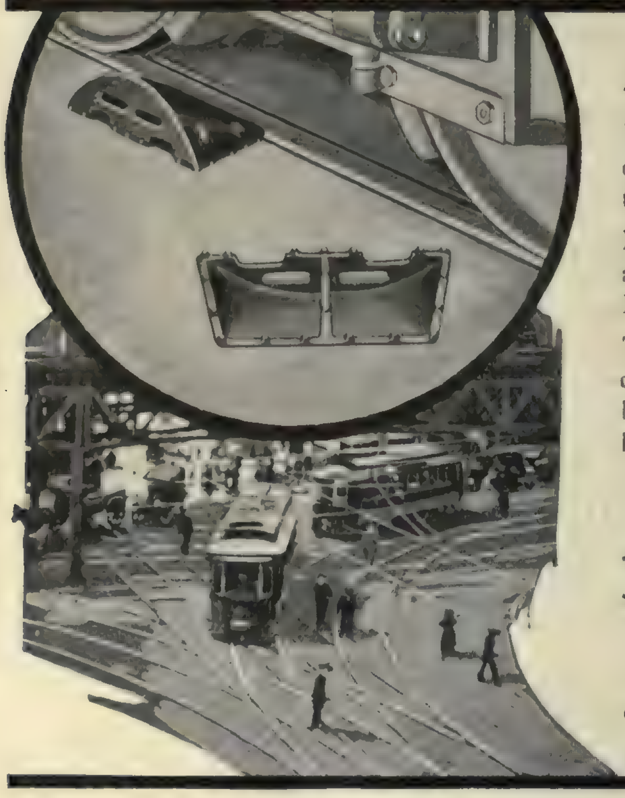

*Every Car Should Carry a Pair*

You can't have a car line and expect to get by without the inevitable "jump-the-tracks" and "smash ups." Every now and then a car gets off the rails. Then what?

Do your men wrestle the car back on the tracks with improvised apparatus, or do they simply run it back on with a set of Reading Trolley Replacers?

To avoid heavy traffic delays, make it a point to see that every car carries a pair. Reading Replacers are light in construction but strong enough to do the work intended and take up very little room.

*Write for particulars*

**AMERICAN CHAIN CO., Inc.**

A·C·C **Reading Specialties Division** A·C·C

*General Sales Offices:*
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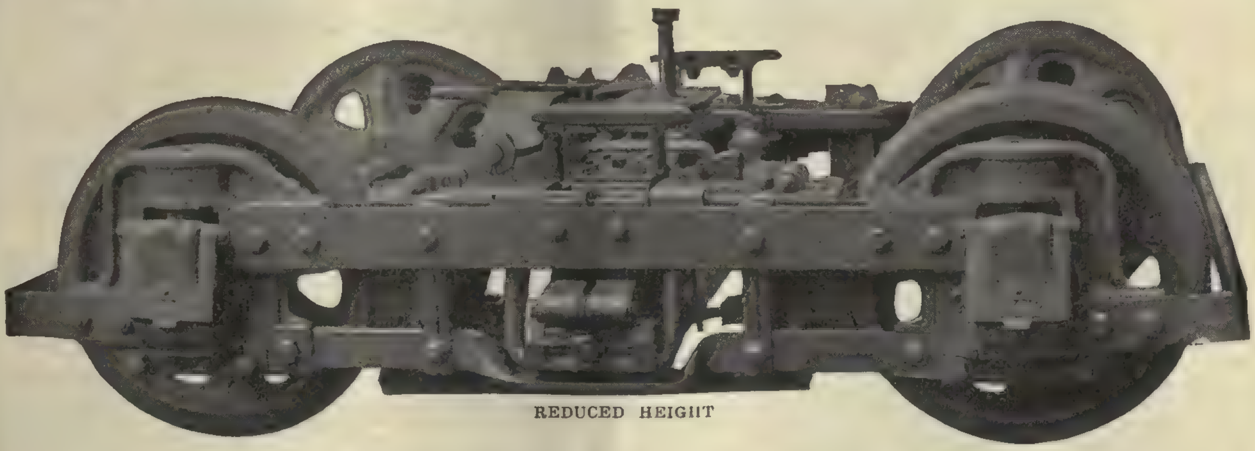
Watch your gears on "Safety Cars" & "Baby motors". The superiority of Tool Steel hardening is more pronounced on the fine teeth than on coarser pitches.

R. H.
TAYLOR REDUCED HEIGHT TRUCK



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TAYLOR R. H. TRUCK
Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

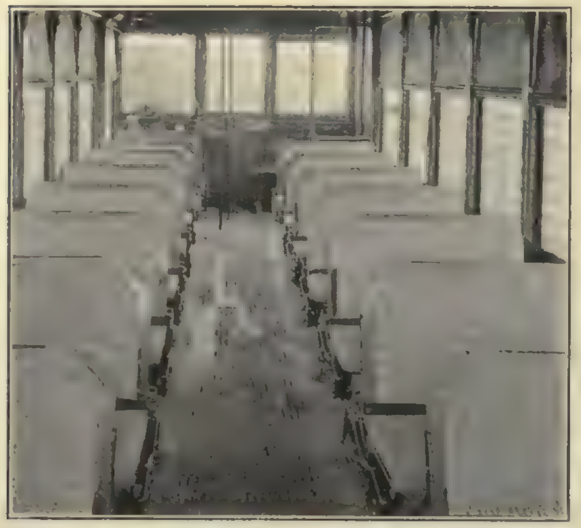
SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car Bodies weighing 16,000 to 22,000 lb. Motors Inside Hung.

EASY RIDING

Journals 3¾ x 7 M. C. B. Type. Height from Rail to Body Bolster, 22¾ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.
SPECIFICATIONS ON REQUEST Established 1892 SEND FOR PORTFOLIO



*Safety Car at Racine, Wis., seats in which are equipped with rattan from the Quality Shops*

## *Genuine Rattan*

from the quality shops is used for seating on the forty safety cars purchased by the Milwaukee Electric Railway & Light Company as is shown in the illustration.

All our rattan is imported. It is cut in widths and lengths to your specification.

We supply the highest quality at prices that are right. Ask us for samples and prices.

*St Louis Car Company*
*St. Louis, Mo.*
*"The Birthplace of the Safety Car."*

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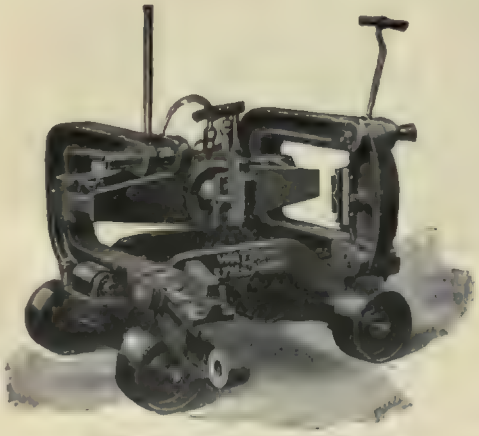

Hydraulic Portable Rail Bender

The portable rail bender shown herewith is designed for use on the road. It is equipped with interchangeable formed bending blocks, and will make any bend without buckling. The hinged yoke permits the rails to be put in sidewise. It can also be used for other heavy bending.

**We build many other handy tools for the railway shop. Such as: Crank Pin Presses, Wheel Presses, Forcing Presses, Forging Presses, Jacks, Pit Jacks, Punches, Shears, Pumps, Accumulators, etc.**

*Write for Catalogs.*

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PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
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Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

No. 2

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Electric Railway Automatic Signals
for Accessibility and Reliability
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for Electric Railways
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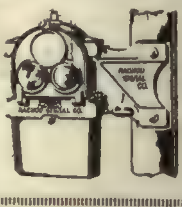
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Electrical Wires and Cables
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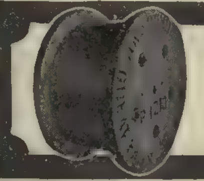

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We specialize in trackmower equipment only.

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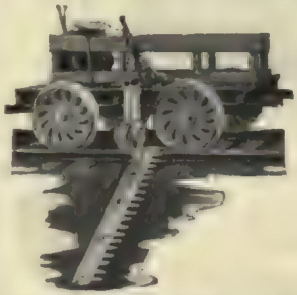

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*Catalog 5-AB*

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STEAM SUPERHEATERS
Were introduced commercially in the United States by this Company. Owners of boilers it has built—Babcock & Wilcox, Stirling and Rust—not now equipped with these coal-saving accessories can obtain information about superheating possibilities from the nearest office listed below.

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Makes permanent, light, level pavement with a minimum of paving repairs.
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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
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International Registers are made in single and double types for a wide variety of uses. Send for our catalogue.

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WATER
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Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

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**Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.**

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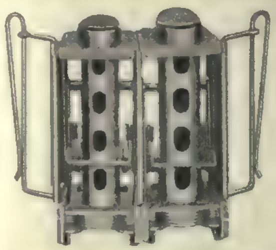

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Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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They always fit the fare.

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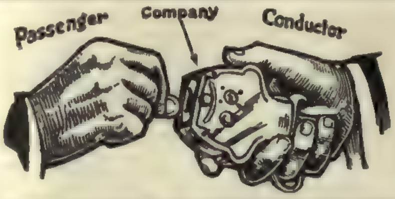

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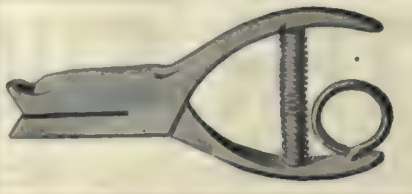

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**"What'll I do if it slips?"**
**"It won't slip!"**

There are no "life nets" in a factory. Hoists are built with a liberal margin of safety. In FORD TRIBLOCS this is 3½ to 1.

FORD TRIBLOCS have won the confidence of thousands of men who use them daily. They know "It won't slip!"

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Field Coils have better protection when wound with "AWEBCO Tape" Send for samples.

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have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

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**THE TERRY TURBINE**
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ELECTRIC RAILWAY JOURNAL

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FOREMAN—14 years' experience in car construction and repairing. Can handle men and cut your upkeep cost. PW-914, Elec. Ry. Journal, Old Colony Bldg., Chicago.

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500 tons 7 in. High 80 lb.

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## A Production Checker

at little cost

Here is an opportunity to get a *Productograph* to keep count and make curve chart record on one to twenty producing machines. From these records you know exactly the production you are actually getting from your machines. No guessing. It is in first class condition and various spare parts are included.

**Bargain price for quick sale.**

W. A. Hefner, care of McGraw-Hill Co., 10th Ave. at 36th St., New York City

FOR SALE—One second-hand

## BUCKEYE ENGINE AND GENERATOR

in good condition, description as follows:

DYNAMO—300 kw.; Mfg. Special 18527; Fields 16; Full Load; Mfg. No. 44813 Armature; Speed 143; Volts 550; Amperes 545; 8 Poles; Winding—Compound; Commutator—Good condition; Brushes—carbon; Type Armature Winding—Form.

ENGINE—Mfg., Buckeye; Horiz. Engine; Mfg. No. 5306½; Generator on right; crank on left; Tandem; Diam. Cyl—12 H 20-L; Stroke 32 in.; Cyl.—not rebored; Shaft Diam.—(in wheel) 14 in.; (in armature) 14; Length—31 ft.; Wheel Diam.—11 ft.; Face 20; Sections 2; Exhaust 12 in.; Floor Space—16½ x 31 ft. 3 in.; Diam. Steam 6 in.; Weight—not known.

**The Beaver Valley Traction Co.**
New Brighton, Pa.

## RAILS—RAILS

90 tons 90 lb. grooved girder Rails.
125 tons New 6 in. Tee—600 tons New 60 to 90 lb.
500 tons No. 1—70 lb. Relay Rails.
Switch Material, Frogs, Angle Bars, Spikes, Bolts.

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*Have you any rail or equipment for sale?*

## IN STOCK
## *for Immediate Shipment*

**Turbo Units, Rotary Converters, Transformers, Motor Generator Sets, Dynamos and Motors**

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Telephone 4337-8 Rector

# Power Plant Equipment

## DIRECT CONNECTED UNITS

1—1800 hp. Cooper cross-compound engine, size 28 x 60 x 60, speed 80 r.p.m., fly wheel 18 ft. 60 ton, direct connected to 1200 kw. G. E. 575 volt generator, 16 pole.

1—1800 hp. Cooper cross-compound engine, size 28 x 60 x 60, speed 80 r.p.m. fly wheel 18 ft. 60 ton, direct connected to 1200 kw. G. E. generator, 16 pole, 575 volt.

2—300 hp. Slater cross-compound engines, size 14 x 28 x 36, speed 120 r.p.m., direct connected to two 250 kw. 550 volt Westinghouse 8 pole direct current generators.

2—300 hp. McIntosh & Seymour tandem-compound engines, size 13 x 23 x 22, speed 200 r.p.m., fly wheel 1 ton, 9 ft. diameter, direct connected to two 220 kw. Walker generators, 550 volt, 8 pole.

1—500 hp. Hamilton-Corliss Simple engine, size 28 x 36, speed 120 r.p.m. 18 ton, 14 ft. 6 in. fly wheel, direct connected to 400 kw. G.E. 550 volt, 8 pole, direct current generator.

2—1500 hp. Pennsylvania Iron Works cross-compound engines, size 30 x 48 x 48, speed 80 r.p.m., fly wheel 22 ft., 50 ton, direct connected to 850 kw. G. E. 575 volt, 12 pole, direct current generator.

1—750 hp. Greene cross-compound engine, size 20 x 38 x 48, speed 100 r.p.m., direct connected to 525 kw. G. E. 550 volt, 8 pole direct current generator.

1—700 hp. Pennsylvania Iron Works cross-compound engine, size 22 x 40 x 42, speed 90 r.p.m., direct connected to 500 kw. G. E. 550 volt, 10 pole direct current generator.

1—400 hp. Hamilton-Corliss cross-compound engine, size 16 x 30 x 42, speed 100 r.p.m., direct connected to 325 kw. Westinghouse 600 volt, 8 pole, direct current generator.

## BOILERS

3—231 hp. B. & W. water tube boilers, 108-4 in. x 18 ft. tubes.

1—250 hp. B. & W. water tube boilers, 126-4 in. x 18 ft. tubes.

1—250 hp. Cahall boiler, 126-4 in. x 18 ft. tubes.

4—250 hp. National water tube boilers, 150-4 in. x 16 ft. tubes.

1—350 hp. Cahall water tube boiler, 168-4 in. x 18 ft. tubes.

1—400 hp. B. & W. water tube boiler, 196-4 in. x 18 ft. tubes, B. & W. 75 deg. superheater.

1—600 hp. B. & W. water tube boiler, 294-4 in. x 18 ft. tubes, B. & W. 75 deg. superheater.

1—500 hp. Edgemoor boiler, 248-4 in. x 18 ft. tubes, Foster 75 deg. superheater.

3—115 hp. Kendall horizontal return tubular boiler, 114-3 in. x 18 ft. tubes.

2—150 hp. Kendall horizontal return tubular boilers, 140-3 in. x 16 ft. tubes.

2—150 hp. New England Iron Works Co. horizontal return tubular boilers, 132-3 in. x 16 ft. tubes.

1—600 hp. B. & W. water tube boiler, 294-4 in. x 18 ft. tubes.

1—250 hp. B. & W. water tube boiler, 126-4 in. x 18 ft. tubes.

2—185 hp. B. & W. water tube boilers, 108-4 in. x 16 ft. tubes.

2—500 hp. B. & W. water tube boilers, 252-4 in. x 18 ft. tubes, 80 deg. B. & W. superheater.

1—500 hp. B. & W. water tube boiler, 252-4 in. x 18 ft. tubes, 50 deg. B. & W. superheater.

3—250 hp. B. & W. water tube boilers, 126-4 in. x 18 ft. tubes.

1—125 hp. Hewey horizontal return tubular boiler.

## ENGINES

2—500 hp. Greene tandem-compound engines for belt drive, size 17 x 33 x 48, speed 104, fly wheels 49 in. face by 16 ft. diameter.

3—500 hp. Hamilton-Corliss tandem-compound engines, size 18 x 34 x 48, speed 72 r.p.m., fly wheels 38 in. face, 22 ft. diameter.

One 700 hp. Cooper cross-compound engine, size 20 x 36 x 48, speed 75 r.p.m., fly wheel 49 in. face, 20 ft. diameter.

1—300 hp. Harris Simple engine, size 22 x 48, speed 79 r.p.m., belt wheel 32 in. face, 17 ft. diameter.

1—125 hp. McIntosh & Seymour high speed horizontal engine.

## GENERATORS

2—500 kw. G. E. 550 volt, 350 r.p.m. 4 pole, direct current generators.

3—300 kw. G. E. 550 volt, 400 r.p.m. 4 pole, direct current generators.

1—250 kw. Seamens-Halski, 550 volt, 440 r.p.m. 6 pole, direct current generator.

1—Booster Set, 59 hp., 900 r.p.m. 550 volt, motor, direct connected to 55 kw. 4 pole generator, 200 volt boost.

1—250 kw. Westinghouse 500 volt, 420 r.p.m., 4 pole, direct current generator.

2—45 kw. 110 volt, G. E. direct current generators.

## MISCELLANEOUS EQUIPMENT

Various boiler feed pumps, condensers, piping, coal scales and auxiliary equipment used in connection with the above units.

*Supplanted by Purchased Power*

**EASTERN MASSACHUSETTS ST. RY. CO.**
**1 BEACON ST., BOSTON, MASS.**

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FOR SALE

# PASSENGER CARS

Two Semi-Steel Single End—Two compartment, smoker and baggage combined—seating capacity 51—Westinghouse A-M-M air brakes D-2-E-G Compressor—St. Louis Type 23-B trucks—34 in. steel wheels, tread 3½ in. flange ⅞ in—5 in. axles—6 ft. 4 in. wheel base—Four Allis-Chalmers No. 302 65 hp. Motors for 600 volts—Gear Ratio, 28-61 Allis-Chalmers S-4 Control. Price, $8,500.00 each.

One Single End—Two Compartment—Smoker and baggage combined—seating capacity 38—air brakes—same compressor, trucks, axles and wheels as above cars—Four Allis-Chalmers No. 501, 50 hp. Motors, 600 volts—Gear Ratio 19-67 Allis-Chalmers S-4 Control. Price, $5,000. All cars now in service, excellent condition but want to sell on account of surplus.

## EQUIPMENT

12 Allis-Chalmers No. 302 Motors, 65 hp. with gear, gear cases and pinions practically new. Price, $400.00 each.

3 Set Allis-Chalmers S-2 Controllers, resisters and single end cables, 600 volts for four 65 hp. Motors.

1 Allis-Chalmers S-2 Controller and cable for double end cars 45 ft. 10 in. long, 600 volts for four 65 hp. Motors.

Also various other equipment—Compressors—Controllers—Cables—Valve—Resister and Switches.

## WANTED

Will Buy—or will trade all or part of above for the following in first class condition:

12 General Electric 600-1200 volts, No. 205 railway motors, complete with gear, gear cases and pinions.

2 General Electric Armatures, 600-1,200-volt for No. 205 railway motors.

1 Railway heavy duty lathe suitable for turning 36 in. wheels—one car wheel press, 350-ton capacity.

1 first class passenger trailer of medium size and weight.

**The Arkansas Valley**
**Interurban Railway Co.**
**Wichita, Kansas**

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# *How to judge your chances for prompt returns—*

You generally hire a man by his record on a job similar to the one for which you need him. His past performance is your gauge as to what you may expect of him.

Likewise, when you select a medium to enable you to fill a business want; the manner in which that medium has and is, helping others is vital. It determines your chances for prompt returns.

We should like to furnish you with concrete evidence of how the

**SEARCHLIGHT SECTION**

is serving others in this field. And when *you* have a business want of any kind that can be satisfied by others in this field you, too, will

*"Think SEARCHLIGHT First"*

0306

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Anchors, Guy**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

**Automobile and Buses**
Brill Co., The J. G.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Standard Steel Works Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Babbitt Metal**
More-Jones B. & M. Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Bankers & Brokers**
Coal & Iron National Bank

**Batteries, Dry**
National Carbon Co., Inc.
Nichols-Lintern Co.

**Bearings and Bearing Metals**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Binders, Rail**
American Chain Co., Inc.
Niles-Bement-Pond Co.
Watson-Stillman Co.
Zelnicker, Walter A., Supply Co. Inc.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.
Rail Welding & Bonding Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

**Bonds, Rail**
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & M. Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms. (See also**
Bates Expanded Steel Truss Co.
Creaghead Eng. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
**Poles, Ties, Posts, Etc.)**
Ohio Brass Co.

**Brake Adjusters**
National Railway Appliance Co.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Wheel Truing Brake Shoe Co.

**Brakes, Brake Systems and Brake Parts**
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Taylor Electric Truck Co.
Westinghouse Traction Brake Co.

**Brooms, Track, Steel and Rattan**
American Rattan & Reed Mfg. Co.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
National Carbon Co., Inc.
Westinghouse Elec. & M. Co.

**Brushes, Graphite**
National Carbon Co., Inc.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

**Bushings, Case Hardened & Manganese**
Bemis Car Truck Co.
Brill Co., J. G.

**Bushings, Graphite & Wooden**
Bound Brook Oilless Bearing Co.

**Cables. (See Wires and Cables)**

**Cambric, Tapes, Yellow and Black Varnished**
Irvington Varnish & Insulator Co.

**Cambric, Yellow and Black Varnished**
Irvington Varnish & Insulator Co.

**Carbon Brushes. (See Brushes, Carbon)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
Differential Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Railway Appliance Co.
St. Louis Car Co.
Thomas, Perley A.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Car, Self-Propelled**
General Electric Co.

**Castings, Brass, Composition or Copper**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
More-Jones Brass & Metal Co.

**Castings, Funnel**
Wharton, Jr. & Co., Inc., Wm.

**Castings, Gray Iron and Steel**
American Steel Foundries
Bemis Car Truck Co.

Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.
Wharton, Jr. & Co., Inc., Wm.

**Castings, Malleable and Brass**
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Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers. Trolley**
Earll, C. I.
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Ohio Brass Co.
Wood Co., Chas. N.

**Ceiling Car**
Pantasote Co.

**Circuit Breakers**
Automatic Reclosing Circuit Breaker Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

**Coin-Counting Machines**
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
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Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Trac. B. Co

**Condensers**
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Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

**Condensor Papers**
Irvington Varnish & Insulator Co.

**Conduit Fittings**
Chicago Fuse Mfg. Co.
National Metal Molding Co.

**Conduits, Underground**
Standard Underground Cable Co

**Connectors, Solderless**
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**Controller Fingers**
Russell Mfg. Co.

**Controllers or Parts**
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General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Electric Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Conveying and Hoisting Machinery**
Columbia M. W. & M. I. Co.

**Copper Wire**
Anaconda Copper Mining Co.
Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

**Cord Connectors and Couplers**
Electric Service Supplies Co
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
American Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Trac. B. Co.

**Cranes**
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

**Cross Arms. (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossings, Frogs and Switches**
Wharton, Jr. & Co., Inc., Wm

**Crossing Signals. (See Signals Crossing)**

**Crossings, Track. (See Track. Special Work)**

**Culverts**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
Pantasote Co.
St. Louis Car Co.

**Cutouts**
Chicago Fuse Mfg. Co.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.
Transit Equipment Co.
Zelnicker Supply Co., Inc., Walter A.

**Derailing Devices. (See also Track Work)**
Cleveland Frog & Crossing Co.

**Destination Signs**
Columbia M. W. & M. I. Co
Creaghead Eng. Co.
Electric Service Supplies Co

**Detective Service**
Wish Service, P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.

**Doors and Door Fixtures**
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General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**
American Electrical Works
Roebling's Sons Co., J. A

**Engineers, Consulting, Contracting and Operating**
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Beeler, John A.
Byllesby & Co., H. M.
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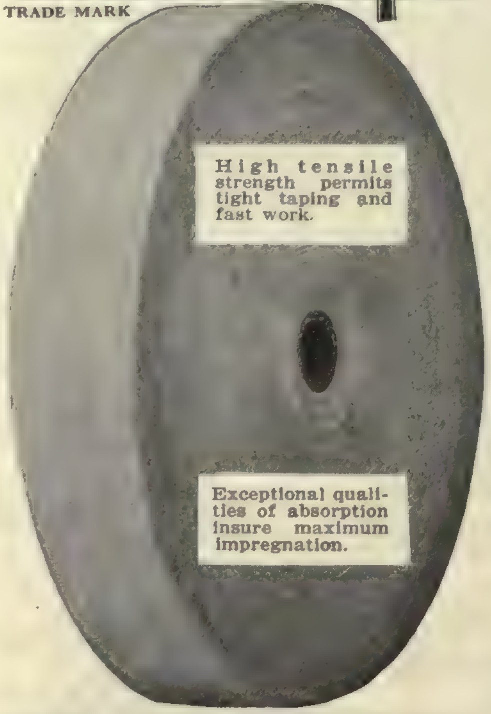

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Exceptional qualities of absorption insure maximum impregnation.

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*Electrical wire, cable and cordage*

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For results — Tapes, Webbings, Sleevings, of uniform and standard quality for electric purposes, that is, Hope Webbing Company service.

***Send for samples and prices***

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Ford, Bacon & Davis
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Holst, Englehardt W
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Jackson, Walter
Kelly Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Scofield Engineering Co.
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Stone & Webster

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**Field Coils. (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B

**Flaxlinum Insulation**
National Railway Appliance Co.

**Floodlights**
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American Mason Safety Tread Co.

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Standard Steel Works Co.
Williams & Co., J. H.

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General Electric Co.
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Williams & Co., J. H.

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General Electric Co.

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Power Specialty Co.
Westinghouse Traction Brake Co.

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General Electric Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

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Standard Steel Works Co.

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Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric**
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**Generators**
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**Graphite**
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**Greases. (See Lubricants)**

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Metal & Thermit Corp.
Railway Track-work Co.

**Grinding Blocks and Wheels**
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Ohio Brass Co.

**Hacksaws**
Gladium Co., Inc.

**Harps, Trolley**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg Co
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Headlining**
Haskelite Mfg. Co.
Pantasote Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co
National Railway Appliance Co
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Yale & Towne Mfg. Co.

**Hose, Bridges**
Ohio Brass Co.

**Hydraulic Machinery**
Niles-Bement-Pond Co.
Watson-Stillman Co.

**Hydrogrounds**
Horne Mfg. Co.

**Injectors**
Schutte & Koerting Co.

**Instruments, Measuring, Testing and Recording**
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Westinghouse Elec. & Mfg. Co.

**Insulating Cloth, Paper and Tape**
Anchor Webbing Co.
General Electric Co.
Hope Webbing Co.
Westinghouse Elec. & Mfg. Co.

**Insulating Machinery**
American Insulating Machinery Co.

**Insulating Varnishes**
Irvington Varnish & Insulator Co.

**Insulation. (See also Paints)**
Anderson M. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Insulation, Slot**
Irvington Varnish & Insulator Co.

**Insulators. (See also Line Material)**
Anderson M. Co., A. & J. M.
Creaghead Engineering Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Macallen Co., The
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
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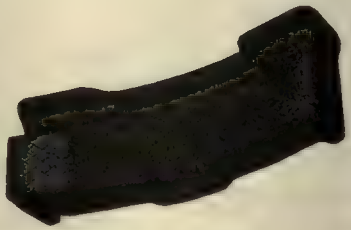

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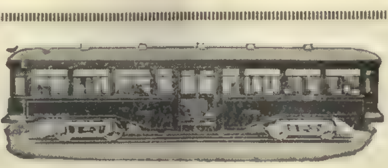

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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Allis-Chalmers Mfg. Co. .......... 54
Allison Co., J. E. .......... 27
American Abrasive Metal Co. .......... 54
Amer. Brake Shoe & Fdry. Co. .......... 51
American Chain Co., Inc. .......... 38
American Electrical Works .......... 41
American Insulating Machinery Co. .......... 41
American Mason S. T. Co. .......... 52
American Rattan & Reed Mfg. Co. .......... 54
American Steel Foundries .......... 55
American Steel & Wire Co. .......... 42
Anaconda Copper Mining Co. .......... 41
Anchor Webbing Co. .......... 43
Anderson Mfg. Co., A. & J. M. .......... 36
Archbold-Brady Co. .......... 42
Archer & Baldwin, Inc. .......... 46
Arnold Co., The .......... 26
Assn. Mfrs. Chilled Car Wheels .......... 34
Automatic Reclosing Circuit Breaker Co. .......... 43

B

Babcock & Wilcox Co. .......... 43
Barbour-Stockwell Co. .......... 42
Bates Expanded Steel Truss Co. .......... 35
Bayonet Trolley Harp Co. .......... 55
Beeler, John A. .......... 26
Belden Mfg. Co. .......... 49
Bemis Car Truck Co. .......... 29
Bennett Field Cross Tie Co. .......... 52
Bonney-Vehslage Tool Co. .......... 44
Borne Scrymser Co. .......... 45
Bound Brook Oil-less Bearing Co. .......... 55
Brill Co., The J. G. .......... 57
Buckeye Jack. Mfg. Co. .......... 45
Byllesby Eng. & Mgr. Corp. .......... 27

C

Cameron Electrical Mfg. Co. .......... 51
Canton Culvert & Silo Co. .......... 37
Clark Mgr. Corp., E. W. .......... 27
Cleveland Fare Box Co. .......... 41
Coal & Iron Nat'l Bank .......... 55
Collier, Inc., Barron G. .......... Back Cover
Columbia M. W. & M. I. Co. .......... 56
Consolidated Car Fender Co. .......... 52
Consolidated Car Heating Co. .......... 44
Continental Fibre Co., The .......... 44
Copper Clad Steel Co. .......... 41
Cooper Heater Co., The .......... 44
Creaghead Engineering Co. .......... 55

D

Page

Day & Zimmermann, Inc. .......... 27
Differential Steel Car Co., The .......... 53
Drum & Co., A. L. .......... 26
Duncan Lumber Co. .......... 41

E

Earll, C. I. .......... 51
Eastern Mass. Ry. Co. .......... 47
Electric Equipment Co. .......... 46
Electric Ry. Equipment Co. .......... 10
Electric Ry. Improvement Co. .......... 18
Electric Service Supplies Co. .......... 11
English-Electric Co., The, Ltd. .......... A

F

Feustel, Robt. M. .......... 26
Flood City Mfg. Co. .......... 41
Ford, Bacon & Davis .......... 26
Ford Chain Block Co. .......... 43
"For Sale" Ads .......... 46-47
Fort Pitt Spring & Mfg. Co. .......... 53

G

Galena-Signal Oil Co. .......... 23
General Electric Co. .......... 24
Gladium Co., Inc. .......... 54
Gold Car Heating & Ltg. Co. .......... 44
Gould, L. E. .......... 27
Griffin Wheel Co. .......... 27

H

Haskelite Mfg. Corp. .......... 51
"Help Wanted" Ads .......... 46-47
Hemphill & Wells .......... 26
Hensley Trolley & Mfg. Co. .......... 38
Holst Englehardt W. .......... 26
Hope Webbing Co. .......... 49
Horne Mfg. Co. .......... 54
Horton Barker & Wheeler .......... 26
Hubbard & Co. .......... 42

I

International Register Co., The .......... 44
Internat'l Steel Tie Co., The .......... 9
Irvington Varnish & Insulator Co. .......... 36

J

Jackson, Walter .......... 26
Jeandron, W. J. .......... 51
Johnson Fare Box Co. .......... 44

K

Page

Kerite Insulated Wire & Cable Co. .......... 41
Kelly-Cooke & Co. .......... 27

M

Macallen Co., The .......... 37
Metal & Thermit Corp. .......... 22
Miller Trolley Shoe Co. .......... 28
More-Jones Brass Metal Co. .......... 55
Morganite Brush Co. .......... 30

N

Nachod Signal Co. .......... 41
National Brake Co. .......... 23
National Carbon Co., Inc. .......... 33
Nat'l Pneumatic Co., Inc. .......... 13
Nat'l Ry. Appliance Co. .......... 53
National Tube Co. .......... 12
Nelsonville Brick Co. .......... 43
N. Y. Switch & Crossing Co. .......... 42
Niles-Bement-Pond Co. .......... 55
Nuttall Co., R. D. .......... 31

O

Ohio Brass Co. .......... 7
Ohmer Fare Register Co. .......... 21
Ordnance Works .......... A

P

Pantasote Co. .......... Front Cover
Parsons, Klapp, Brinckerhoff & Douglas .......... 26
Perey Mfg. Co., Inc. .......... 44
Peters & Co. .......... 55
Phoenix Works .......... A
Positions Wanted and Vacant .......... 46
Power Specialty Co. .......... 43

R

Rail Joint Co. .......... 42
Rail Welding & Bonding Co. .......... 19
Railway Track-work Co. .......... 14
Railway Utility Co. .......... 51
Ramapo Iron Works .......... 43
Rawls Machine & Mfg. Co. .......... 42
Republic Engineers, Inc. .......... 26
Richey, Albert S. .......... 26
Roebling's Sons Co., John A. .......... 41
Rooke Automatic Register Co. .......... 44

S

Page

St. Louis Car Co. .......... 10
Samson Cordage Works .......... 45
Sanderson & Porter .......... 26
Sangster & Matthews .......... 27
Scaife & Sons Co., Wm. B. .......... 44
Schutte & Koerting Co. .......... 45
Searchlight Section .......... 46-47
Siemens Works .......... A
Silver Lake Co. .......... 53
Smith & Co., C. E. .......... 26
Smith Heater Co., Peter .......... 54
Standard Steel Works Co. .......... 32
Standard Textile Products Co. .......... 20
Star Brass Works .......... 43
Stone & Webster .......... 26
Stucki Co., A. .......... 53

T

Taylor Electric Truck Co. .......... 39
Terry Steam Turbine Co. .......... 45
Texas Co. .......... 33
Thomas, Perley A. .......... 53
Tool Steel Gear & Pinion Co. .......... 39

U

Union Switch & Signal Co. .......... 8
U. S. Electric Signal Co. .......... 6
Universal Lubricating Co. .......... 15

W

"Want" Ads .......... 46
Watson-Stillman Co. .......... 40
Western Red Cedar Asso. .......... 16-17
Westinghouse Elec. & Mfg. Co. .......... 4
West'gh'se Traction Brake Co. .......... 5
Wharton, Jr. & Co., Wm. .......... 42
Wheel Truing Brake Shoe Co. .......... 53
White Eng. Corp., The J. G. .......... 26
Williams & Co., J. H. .......... 45
Wish Service, The P. Edw. .......... 52
Wood Co., Chas. N. .......... 41

Y

Yale & Towne Mfg. Co. .......... 55

Z

Zelnicker in St. Louis .......... 46

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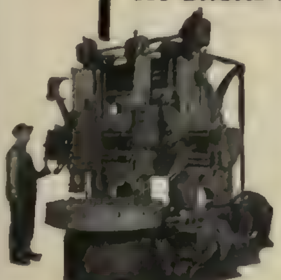

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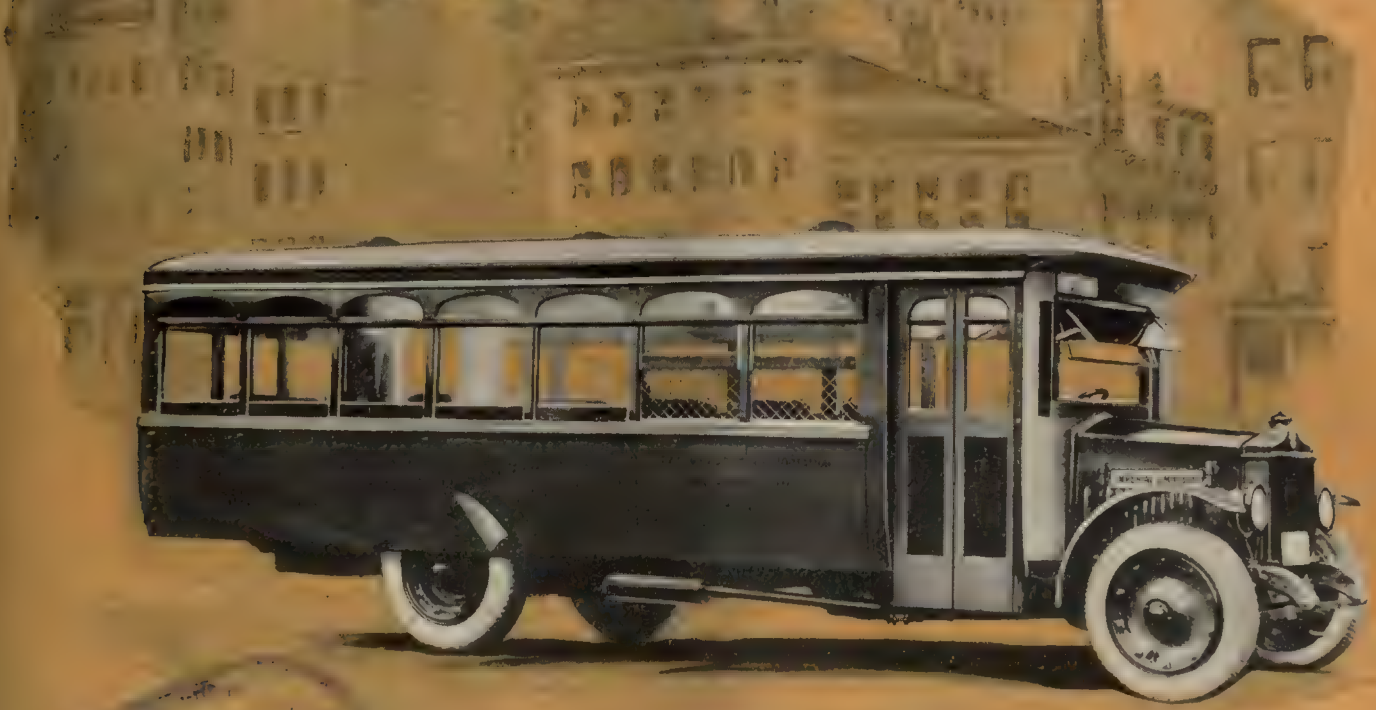
# ELECTRIC RAILWAY JOURNAL



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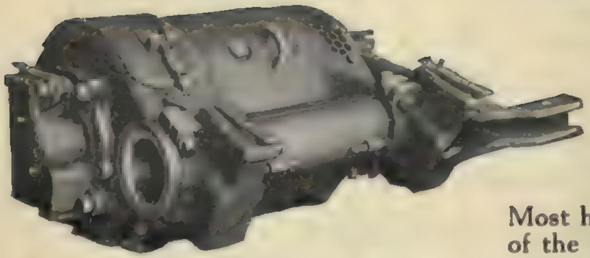
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East Pittsburgh, Pa.

# Westinghouse

*Vol. 58, No. 2* New York, July 9, 1921 *Pages 39 to 78*

# Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

## *Contents*

### Serving Trolley Freight and Motor Truck Customers

The trolley freight systems of the Springfield-Boston area hold their own through adverse times because of reliability, frequency of service and low cost. Healthy growth attained despite drawbacks........................Page 41

### San Francisco Rerouting Effective

Rush-hour conditions on the Market Street lines of the Municipal Railway and the Market Street Railway became such that relief was necessary. This ferry terminal holds the world's record in its class for traffic density........Page 49

### Central Electric Railway Association Meets on Ship

Real accomplishment marks meeting, intermingled with a delightful cruise on the Great Lakes. Automatic substations, merchandising transportation, freight claim reductions and separate engineering organizations are discussed ....................................................Page 53

EDITORIALS .................................. 39
BAKING SODA QUENCHES FIRE................ 47
FIVE AND TEN-CENT BOSTON FARES........... 47
NEW INTERLOCKING INSTALLATION ON BOSTON ELEVATED ................................ 48
REGULATIONS FOR JITNEYS................... 50
LIVING COSTS DROP IN AKRON............... 51
BUS SUBSTITUTE FOR EARLY CARS............ 51
LETTERS TO THE EDITOR..................... 52
SALE OF SECURITIES BY UTILITIES........... 65
FIRST CONVENTION OF THE NEW INTERNATIONAL ASSOCIATION ............................ 65
ANOTHER UTILITY INFORMATION BUREAU FORMED ................................ 66
ASSOCIATION MEETINGS..................... 66
AMERICAN ASSOCIATION NEWS................ 66
NEWS OF THE ELECTRIC RAILWAYS............ 67
FINANCIAL AND CORPORATE................... 70
FINANCIAL NEWS NOTES..................... 72
TRAFFIC AND TRANSPORTATION................ 73
TRANSPORTATION NEWS NOTES................ 75
PERSONAL MENTION......................... 76
MANUFACTURES AND THE MARKETS............ 77

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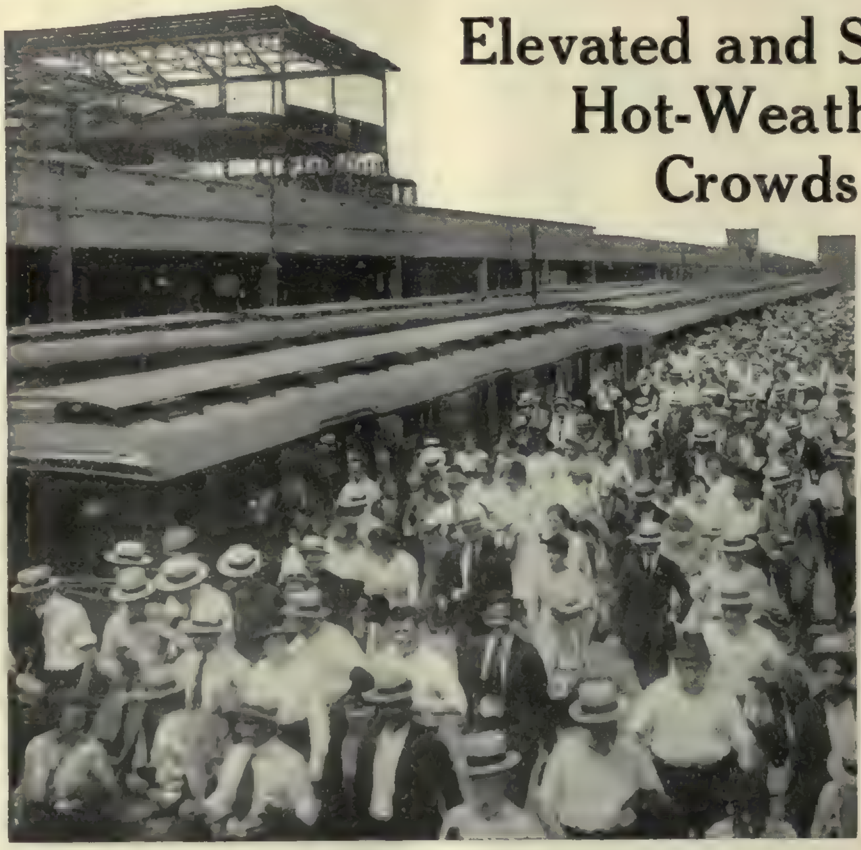
Advertising Index—Alphabetical, 48; Classified, 42, 44, 46; Searchlight Section, 40-41



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THE D-3-F Type WESTINGHOUSE COMPRESSOR, with a displacement of 38 cu. ft. per minute and a capacity for *continuous operation* at 100 lbs. pressure without the possibility of a dangerous rise in temperature, is designed for heavy traction service on Elevated and Subway cars where an unusually large and continuous volume of compressed air is required.

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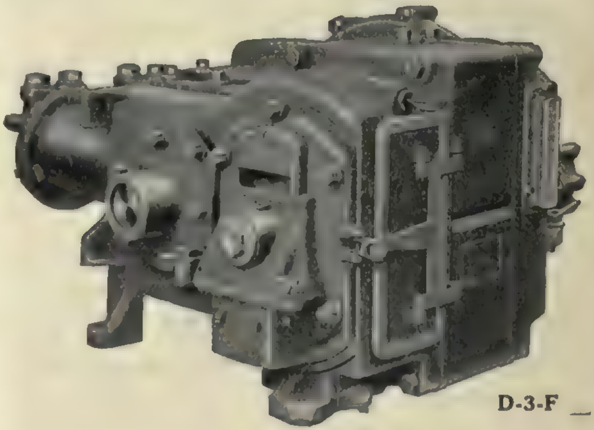
The general design incorporates all the desirable features of the other well-known standard Westinghouse Compressors.



D-3-F

*The latest improved-type cars of the New York Municipal Railway are equipped with the D-3-F*

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LOS ANGELES
SALT LAKE CITY
WASHINGTON

# Safety Car in Colorado Springs with Famous Pike's Peak in Background

## Comparisons

Few tourists in the West return home without stopping over at Colorado Springs and Pike's Peak. On the hotel registers there may be found the names of residents of nearly every town and city in the country.

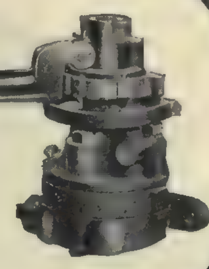
They bring back home with them, amongst other impressions, a distinctly pleasant recollection of the splendid street car service furnished with Safety Cars in the little mountain city. And the comparison with the home-town cars is not always favorable.

They have experienced something better with respect to speed, comfort, frequency and safety.

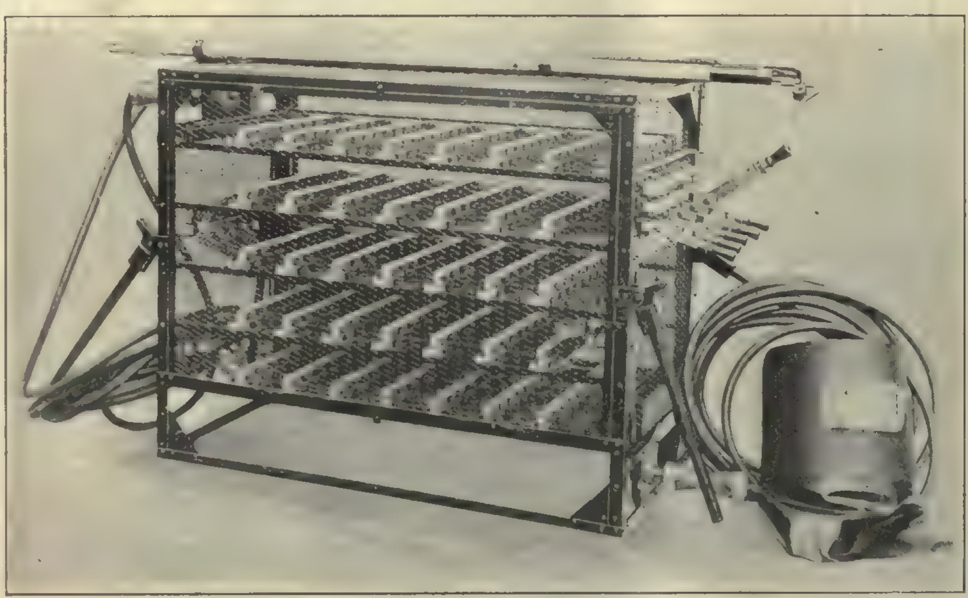
Modern, economical Safety Car equipment pays for itself by decreasing expenses and attracting additional revenue traffic.

*To be a Safety Car it must be equipped with our Standard Safety Car Devices. The safety of passengers is guaranteed by the fact that should the operator lose control for any reason, the current would be cut off, brakes automatically applied, doors "balanced" and rails sanded.*

**Safety Car Devices Company**
of St. Louis
Postal and Telegraphic Address
and commercial headquarters
Wilmerding, Pa.



# WARRIORS against WASTE



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**Salvage**
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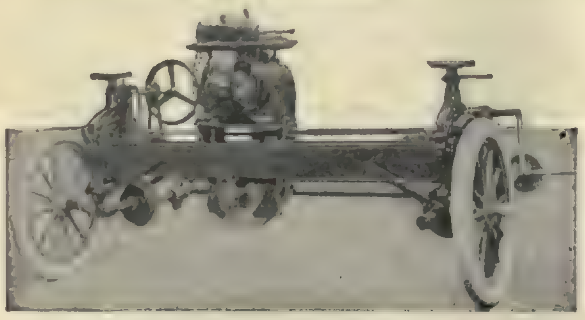
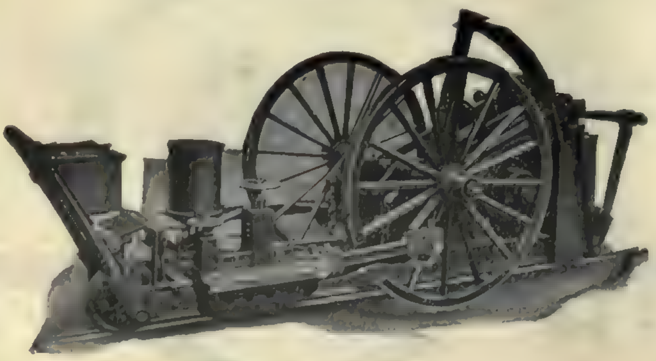


UNIVERSAL Rotary Track Grinder



RECIPROCATING Track Grinder

## Reduce Bad Track Wastes

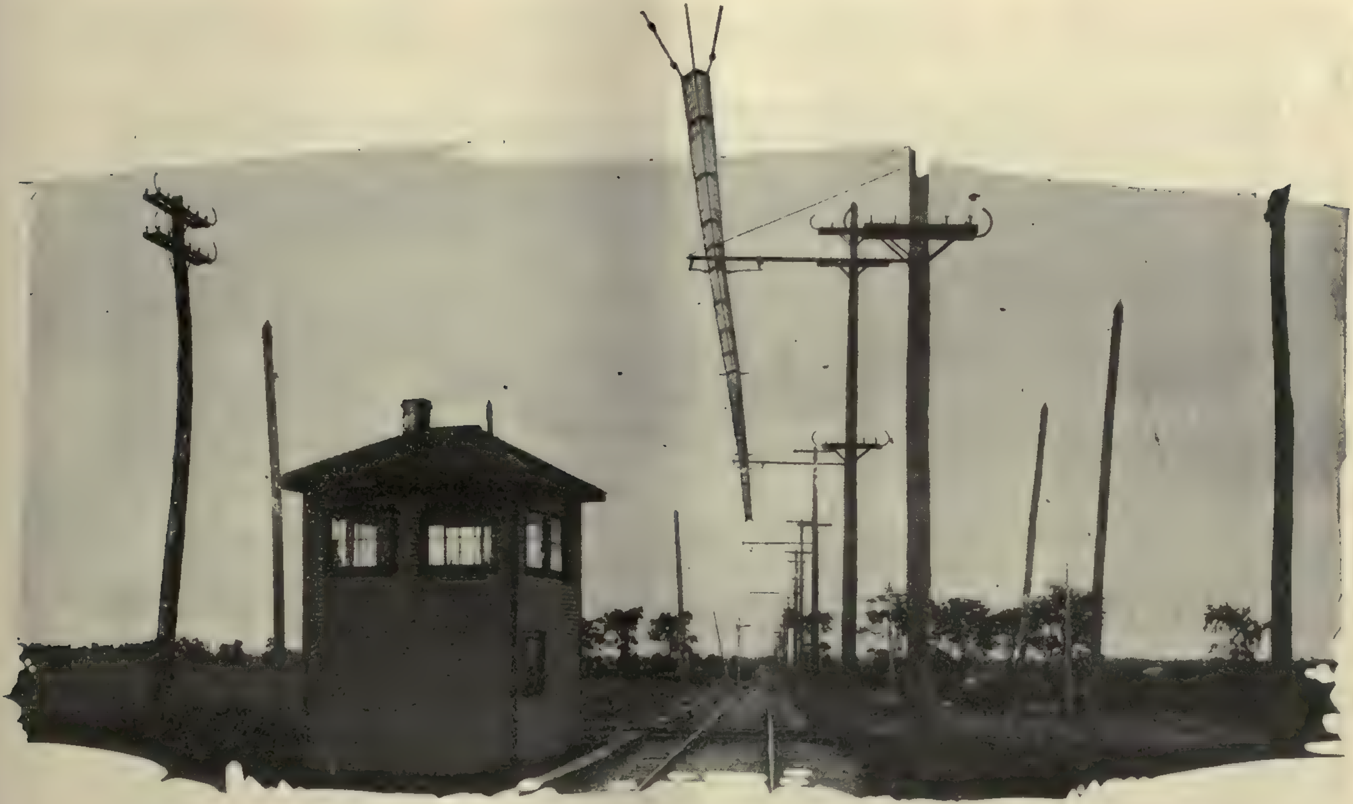
*Committee of the American Engineers Council places blame for 50% of industrial waste on employers and only 25% on labor—(Newspaper headline).*

This proportion may not be the same for the electric railway field, but the wastage of power, the costly use of men and materials for car repairs, and the more rapid deterioration of the track itself, all due to failure to properly maintain the track, are certainly not wastages chargeable to labor.

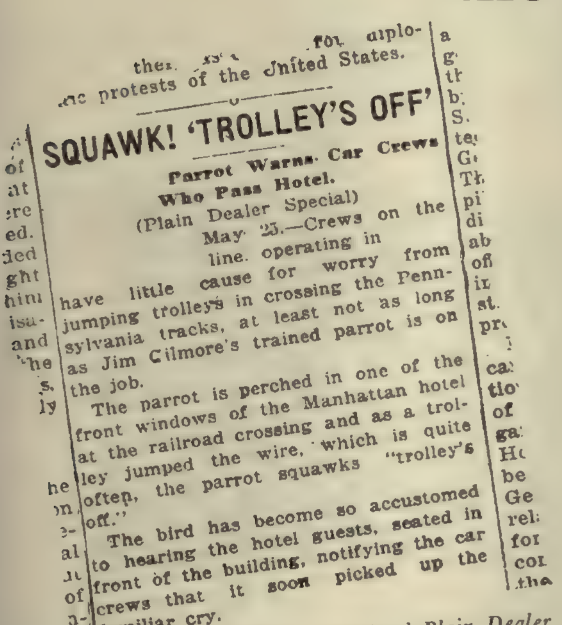
We are prepared to furnish you a complete outfit for the salvaging and improvement of track by means of welding and grinding.

Let us go into the track rehabilitation problem with you.

**Railway Track-work Co.**
**3132-48 East Thompson St.,**
**Philadelphia, Pa.**



# National Trolley Guard Protecting the Point of Greatest Danger



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the protests of the United States.

## SQUAWK! 'TROLLEY'S OFF'

**Parrot Warns Car Crews Who Pass Hotel.**

(Plain Dealer Special)

May 25.—Crews on the line. operating in have little cause for worry from jumping trolleys in crossing the Pennsylvania tracks, at least not as long as Jim Cilmore's trained parrot is on the job.

The parrot is perched in one of the front windows of the Manhattan hotel at the railroad crossing and as a trolley jumped the wire, which is quite often, the parrot squawks "trolley's off."

The bird has become so accustomed to hearing the hotel guests, seated in front of the building, notifying the car crews that it soon picked up the familiar cry.

*—From Cleveland Plain Dealer*

Railroad crossings are always bumpy and uneven. The heavy trains are sure to pound the electric tracks out of line. Trolley wire is always high.

So a railroad crossing is just the place where the trolley wheel jumps most often. Yet it is just the place where a wild trolley can be fatal—unless National Trolley Guard is on duty.

National Guard is a trough of open wire mesh inverted over the trolley wire. When the wheel jumps it runs on the guard and collects power to carry the car off the tracks—out of danger.

One accident is liable to cost more than National Trolley Guard for every crossing on your property.

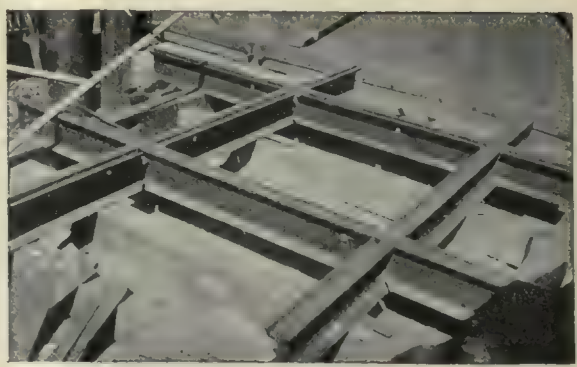
MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

## The Ohio Brass Co., Mansfield, Ohio

New York Philadelphia Pittsburgh
Chicago Los Angeles
San Francisco Paris, France

*Products*: Trolley Materials; Rail Bonds; Car Equipment; Third Rail Insulators; High Tension Porcelain Insulators.

*Worn out manganese insert crossing, Fall River, Mass., which was replaced by a Thermit welded crossing.*



*Rails cut out and assembled together in position.*

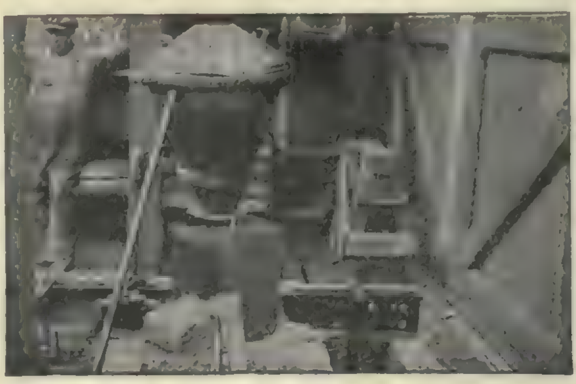
# When Frogs and Crossings are Constructed by the Thermit Welding Process

The Thermit welds will be stronger than the rail itself, and the resulting special work will be more flexible and lasting than that in the making of which heavy masses of cast iron are used.

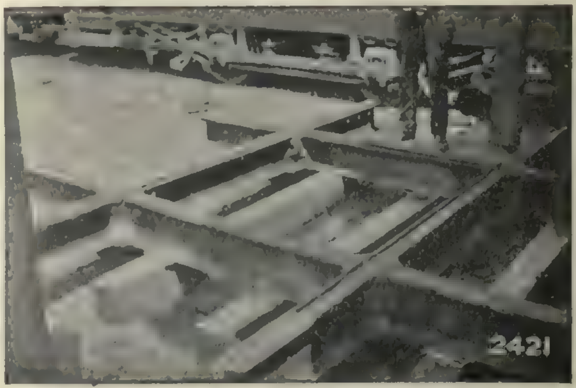
It is true that the parts subject to pounding and shock are simply rail steel, but by most engineers this is now considered to be an advantage in that any damage to the points, etc., can be repaired by the addition of metal by means of the electric welder; and it is a peculiar fact that this tough rail steel, an integral part of the entire special work withstands this pounding and shock to a surprising degree

Let us send you a Thermit outfit at once and let our experienced track engineers instruct your men in constructing a Thermit crossing by using simply the rail which you have on hand, your own track labor and the Thermit outfit and materials.

*Send for our latest Rail Welding Pamphlet* 3932.



*Crucible set over mold, ready to start Thermit reaction.*



*Welded crossing, ready to be installed in street.*

## METAL & THERMIT CORPORATION

SERVICE STRENGTH
THERMIT WELDING
ECONOMY

**Boston**
**Pittsburgh**
**Chicago**

**120 Broadway New York**

**Toronto**
**South San Francisco**

# Will You Reinforce or Weaken Your Track Foundation?

The three-inch channel members of STEEL TWIN TIES spaced every three feet act not only as ties but reinforce the track foundation concrete.

To this efficient auxiliary value of Steel Ties in concrete construction may be contrasted the separating action of wood ties in breaking up the concrete into short, transverse blocks, and the tendency of wood ties to collect water which, when it freezes, is often the beginning of track troubles.

Large unit bearing, effective reinforcement and economy of concrete and track labor are essential virtues of STEEL TWIN TIE TRACK.

**INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio**

International Products:—STEEL TWIN TIES; STEEL CROSSING FOUNDATIONS and STEEL PAVING GUARD; are manufactured and sold for us in Canada by The Sarnia Bridge Co., Ltd., Sarnia, Ont.

# This Railway Saved $702 in One Month by Installing Lincoln Bonds with a RWB Dynamotor

"During the month of August the K. W. H. per car mile was 3.56, this being before the bonds were installed. At the end of October the power consumption for the month dropped to 2.75 K.W.H. per car mile, showing a reduction of .81 K.W.H. per car mile due almost entirely to the new installation of these bonds. We are paying two cents per K.W.H. for the power used on this line, which shows a saving of 1.62 cents per car mile.

"As the total car mileage for the month of October was 43,348, this means a saving of $702.23, which at this rate would pay for the entire cost of the installation of the bonds in ten weeks."

So writes a well known mid-west engineer of way and structures after welding Lincoln Bonds to rails in September by the Carbon Arc Process with a R. W. B. Dynamotor.

Remarkably satisfactory results are obtained with this equipment by many electric railways in welding Lincoln Bonds to rails, building up worn and cupped rails and crossovers, shop welding and fish plate welding.

Have you investigated the economies of this equipment as applied to your company?

## Rail Welding & Bonding Co.
Cleveland. O.

**N. Y. Office,**
**30 Church Street**
**Chicago Office,**
**343 So. Dearborn Street**

# ADVERTISE your service to these places

## KEYSTONE-HUNTER Illuminated Car Signs

Stimulate the riding habit by constantly suggesting the amusement and breathing places your lines reach. Jog the memory of the people who see your cars. Advertise today's game. Let them know the circus is in town. Remind them that Wonderland is still open.

Do it with Keystone-Hunter Illuminated Signs. They are more than destination and routing signs. They advertise the breadth and scope of your service—by day and by night.

**Made in various sizes to use any place on your cars, on the poles at transfer points, and for suspension over terminal tracks**

*Send for complete data*

## Electric Service Supplies Co.

*Manufacturer of Railway Material and Electrical Supplies*

**PHILADELPHIA NEW YORK CHICAGO**

**Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto**

# FOR

# "AGASOTE"

TRADE MARK

For Roofs, Headlining and Wainscoting

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# "PANTASOTE"

TRADE MARK

For Curtains and Upholstery

## THE PANTASOTE COMPANY

11 Broadway, N. Y.
People's Gas Bldg., Chicago, Ill.
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*Modernize!* *Pneumatize!*

45,000

National Pneumatic Door Engines

are today operating successfully on over 10,000 cars in this country alone, same having been applied to every type of car adopted by the American Railway Industry.

WHY? National door engines are dependable in every detail, are applicable to every class of service and afford greatest efficiency in Passenger Control and Transportation in general.

Our SERVICE engineers are always at your disposal.

National Products

Door and Step Control
Motorman's Light Signals
Door and Step Operating Mechanisms
Interlocking Safety Door Control
and
Multiple Unit Door Control

*ASK OUR REPRESENTATIVE TO CALL*

WE'RE AN OLD HAND AT THE GAME

***Manufactured in Canada by***
**Dominion Wheel & Foundries, Ltd.**
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National Pneumatic Company, Inc.
50 Church St., New York
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DAYTON

# afford to wait any longer

## to re-lay that stretch of bad track

**_because_**

—every day the hammer blows from those bad joints are increasing the depreciation of your rolling stock.

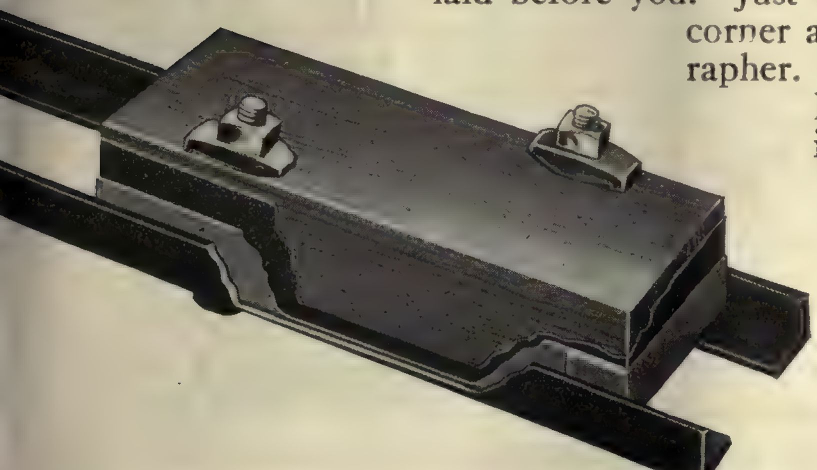
—it will cost you more money to do the job during the winter months.

—by re-laying it now on Dayton Resilient Ties—the ties you will eventually use—you will save from $2,000 to $6,000 per mile.

## *Dayton Resilient Ties*

Reduce First Cost
Give Longer Track and Paving Life
Reduce Track and Paving Repairs
Reduce Upkeep of Rolling Stock
Reduce Traffic Noise

You want to save money on that next track job—and you want to get a better track. Have the absolute facts about track construction laid before you. Just tear off the coupon in the corner and hand it to your stenographer. It will bring you complete literature on Dayton Resilient Ties, which will tell you how other companies are saving money and building better track through their use.



The Dayton Mechanical
Tie Company
710 Commercial Bldg.,
Dayton, Ohio

**Resilient**
**TIE**

PIN TO LETTER

**Dayton Mechanical Tie Company**
**710 Commercial Bldg.,**
**Dayton, Ohio**

Without obligation, please send me full information about your Dayton Resilient Ties.

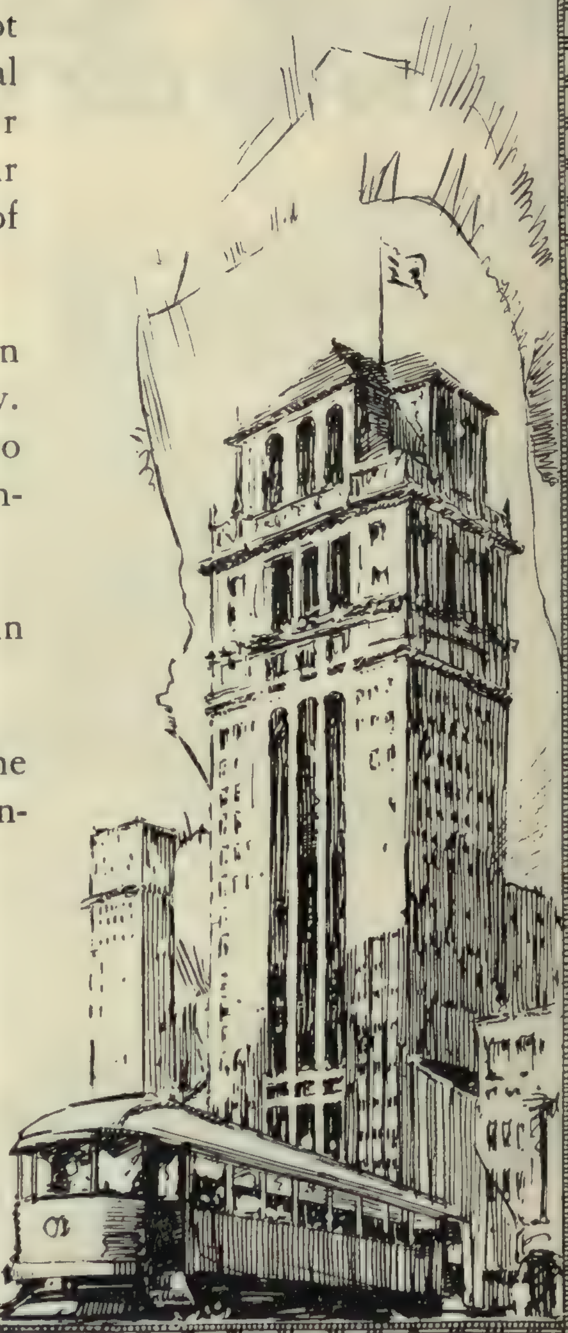
REAL INVESTORS are not speculators. Safety of capital and fair return are their standards by which to judge their transactions. Especially, safety of capital.

Car Card space is Capital. It can produce just so much with safety. It cannot produce more than so much permanently or without danger of capital loss.

Space wrongly used shrinks in value.

COLLIER SERVICE guarantees the full value of the capital by maintaining the value of the space.

**Barron G. Collier**
INCORPORATED
CANDLER BLDG NEW YORK



The World's best Lubricants

GALENA QUALITY

# Telling something you already know

The great majority of the electric railways of the United States are using Galena Oils and Galena Service for car and power house lubrication.

These railways specify Galena products for one reason only—because they have proven their superiority in the tests of actual service.

This company *specializes* in the business of railway lubrication. It is not a *side line.* Galena Oils are built especially for railway work, each grade for a specific purpose. They are the result of years of painstaking test and study, given by practical mechanical men who know the requirements of the service.

Quality is the foundation stone of Galena business—quality in oils and quality in service. Galena Oils are the recognized quality standard for railway lubrication, everywhere. As representatives of the oldest and largest lubrication organization in the world, Galena Service is in constant touch with the latest developments in railway work, and is further perfecting efficiency in the scientific lubrication methods that have already proved a most valuable aid to the railways in producing improved operation.

Therefore, the ever-increasing demand for Galena lubricants is but an honest tribute to merit daily exemplified by incomparable performance on the railways of the East, West, North and South.

***When Galena Service Goes In***
***Lubrication Troubles Go Out!***

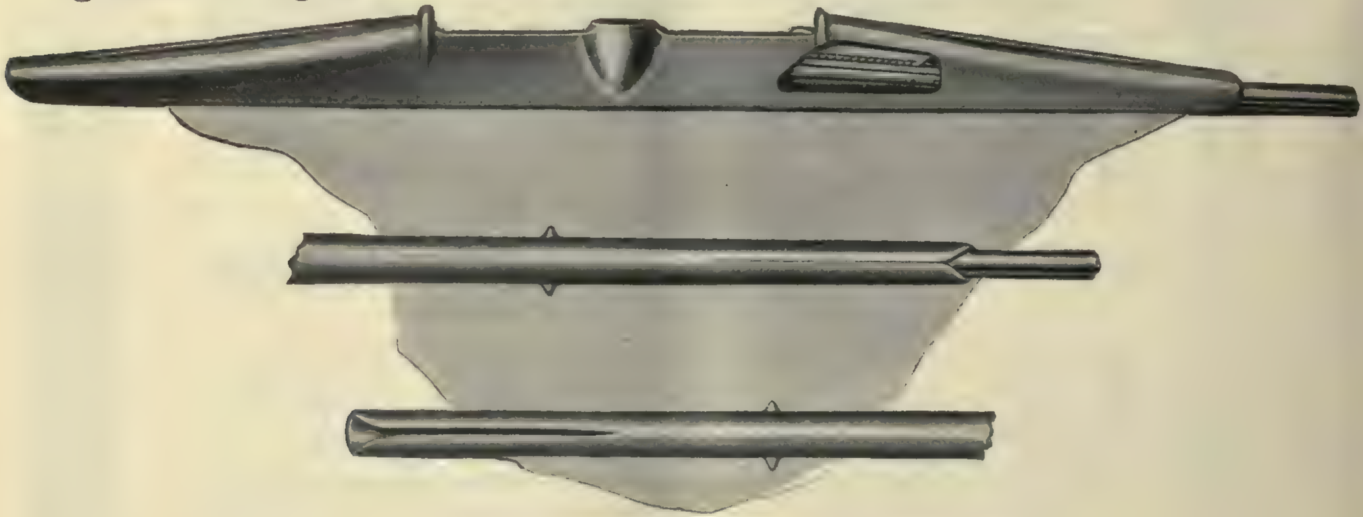
TRIGRAM G S O C TRADE MARK

## THE GALENA-SIGNAL OIL CO.

NEW YORK FRANKLIN, PA. CHICAGO
*Offices in all principal American Cities*
LONDON BUENOS AIRES PARIS

GALENA SERVICE

*One sure way to reduce the trouble and expense of line-down tie-ups is to use sleeves that can be relied on for great strength*



## They Stick To Their Job

Imagine a joint or a suspension point in a trolley wire being stronger than the wire itself! Improbable? Not at all. That's exactly the sort of strength G-E R-3 Splicing Sleeves bring to a line. With standard wedges they will solidly hold a wire worn to half size.

Heavy strain tests on the R-3 show that wire invariably breaks outside the sleeve. The device itself does not weaken. The ends of the R-3 are tapered to dampen out vibration, thus reducing the chance of wire snapping at the sleeve tips. The long, V-shaped slot in the bottom permits the tips to be peened neatly around the wire forming a smooth path for trolley wheels.

The R-3 does double duty. By the addition of an adapter it becomes an ear. Its users, therefore, need not carry a stock of both ears and sleeves.

**General Electric Company**

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

40-184

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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*Volume* 58 New York, Saturday, July 9, 1921 *Number* 2

## The Golden Mean in the Use of Autos

THE USE of autos instead of street cars by railway officials in inspecting their properties has been criticised once or twice in these columns by managers who believe that thereby many faults of the transportation force escape detection. Mr. Dana, in a communication in this issue, points out very properly that the automobile is a necessary tool under modern conditions to annihilate time and distance in the efficient conduct of a large urban property, and his remedy is for the manager to see that this tool is used only for the purpose for which it is intended.

This is undoubtedly the correct answer. In nearly all questions on which men differ there is a golden mean. The Western manager whose letter published in these columns began the discussion called attention to a real evil. The best place for an official to watch the performance of the trainmen and to determine the effect of track maintenance on car operation is on the car itself. Hence, if an electric railway official uses his own cars so far as he can to travel from one point to another on his system he not only uses his time spent in traveling in the performance of his duties, but he gets better acquainted with the operating force. But there are times when speed in getting from one point on the system to another is essential, and here the faster vehicle is desirable. The Western manager admits that there are instances of this kind. He protests only against the automobile "habit," through which he says the company is in danger of losing the services of a once efficient official.

## Stability of Earning Power of Electric Railways Shown

ONE of the claims often made, and properly, in the past for electric railways as an investment was that their earnings are not as greatly affected as are many other industries by adverse industrial conditions. During the past few years electric railways have rather been ignored by the average investor, who has been attracted by the more alluring industrials, "war brides," oil companies and shipping companies. During the past twelve months, and especially the past six months, however, some of these latter companies have fallen into hard times. The export business has decreased due to high exchange and other reasons and domestic demand has become much less, so that dividends have been suspended and both gross and net have decreased.

A table published in the department "Financial and Corporate" in this issue shows how the electric railways have fared during this period. The list is not a selected one, being all of the railways in a list published weekly in the *Commercial and Financial Chronicle* of public utilities which report monthly earnings to that paper. Of this list of thirty companies, only three show decreases in gross earnings for this year to date as compared with last year to date. The decreases for the companies mentioned are minor, while notable increases are recorded for the other properties reporting, especially the larger companies. All figures are quoted irrespective of mileage, but it is not believed that any of the companies outside of the two subway companies in New York have added materially to the miles of track operated by them during the year in which comparison is made. The showing is a notable one of the stability of earning power of electric railways.

## What Happened in Illinois

THE Illinois Legislature has adjourned, leaving a record that, if not creditable for measures adopted, is at least complimentary for the bills killed. The principal measures fostered by the Governor and Chicago's Mayor, in line with election campaign pledges, were one that would create a transportation district as a means of bringing about people's ownership and a 5-cent fare and another designed to abolish the public utilities commission and create home rule. What happened was somewhat of a surprise, as there developed in the last few days of the legislative session a sentiment in the state which finally resulted in a clean-cut repudiation of the plans of the administration.

The transportation district bill, which had been so worded that the referendum vote on it would have come at the time of the next Chicago mayoralty election and thus again made the traction situation the election issue, was killed altogether. The public utilities regulation bill was finally passed, but not until more than sixty amendments had so disfigured it that the original measure could scarcely be recognized. The home rule feature is virtually eliminated. But the bill does abolish the present commission, and in that sense only does it carry out the Governor's promise. But even then the new law as amended makes a better statute than the old one from the standpoint of the utilities. The new statute practically continues the old one with these changes: The Illinois Public Utilities Commission, with five members at $5,000 each, is abolished and the Illinois Commerce Commission (I. C. C.), with seven members at $7,000 and eight assistant commissioners at $5,000, is created. There is a provision that a petition originating with the voters (not the City Council) and signed by 25 per cent of the registered legal voters will bring about a popular vote on whether the local utilities shall be subject to local instead of commission regulation. If home rule is established in any city, the order of appeal from orders of the Council shall be first in the county in which the complaint originates. Some of the positions of the commission have been removed from under civil service requirements. By a separate bill the annual appropriation for the commission was increased by $500,000. There may be other provisions contained in the mass of amendments jammed through at the last minute that are not yet assimilated.

Upon analysis, none of these provisions appears dangerous to the utilities. An increase in the size of the commission has often been thought desirable as a means of speeding up its work. The likelihood of securing a petition for home rule vote, signed by 25 per cent of the registered voters of a city, seems decidedly remote. In Chicago, for example, this would mean the names of more than 200,000 voters on the petition, and if that many people were sufficiently aroused against a utility to sign such a petition it would seemingly indicate that there was something radically wrong and a change ought to be made. Furthermore, since it is provided that appeal from a local order shall be made to the commission, this would seem to forestall any great value in having home rule and to strengthen the position of the commission.

So, while the new law does increase the patronage to be distributed by the Governor, no particular damage has been done the righteous cause of the utilities, and since the legislators have determined, in spite of the influence of a most pernicious and powerful political machine, not to take those steps that would keep the public service companies in politics and uncertainty, the fears for their future welfare in Illinois will be largely dispelled.

### Central Electric Railway Association Provides for Better Engineering

HOLDING its summer meeting under ideal surroundings, the Central Electric Railway Association not only enjoyed to the fullest measure its delightful cruise on the Great Lakes but also set up a record of worth-while accomplishments. Of particular importance was the plan, approved subject to detailed development, providing for separate meetings of the engineering members. For several years there has been an agitation in the association for some scheme that would permit the engineers to gather by themselves, free from the restraint of the bosses' presence, for the purpose of exchanging ideas and experiences on common problems. The plan devised is quite different from any heretofore discussed and whether it will work out satisfactorily remains to be seen. At any rate the association is to be congratulated for taking steps to provide these much desired and potentially valuable meetings, and if the present plan does not work out it can be revised. Its success as always depends upon the willingness of individuals to work.

One weakness common to much association work has been recognized and guarded against by providing an engineering council whose duty it is to lay down a program each year for the work of the sectional meetings. The latter will therefore meet for a definite purpose and will know toward what end it is working. However, this definite assignment of duty should not preclude the possibility of having free round-table discussion on any point brought up by any member, for this was the primary reason for seeking these separate meetings. There is some doubt whether the grouping of equipment, electrical and track men together in the same meetings will be as fruitful of results as are the meetings held in Pennsylvania and Ohio for the equipment men exclusively. On the other hand, there will be opportunity to discuss and work out the various technical questions of mutual or interdepartmental interest. In any event the plan laid out by the association is a step in the right direction and will serve to make the association of greater interest and usefulness to the engineers and the operating men and finally to the companies.

### What It Means to Classify the Jitney as a Common Carrier

PUBLIC carriers have exercised their calling for the last 2,000 years or longer, and the rights of the public to establish routes and exercise some sort of supervision as to their maintenance and to prevent discrimination in charges has been recognized for a very long period. In fact, it is difficult to imagine a common carrier service without the acceptance by the carrier of certain definite responsibilities to the public, along the lines at least of the maintenance of a schedule so far as it can be done and a uniformity in charges for the transportation supplied. The recognition of the right of the authorities to exercise such regulation is second nature to the railway men, but hardly so to the average jitney operator, who wants to enjoy the privileges of the common carrier but to avoid all of its duties and responsibilities.

While the thinking men among the motor bus operators favored and even urged the passage of regulating legislation, yet it is easy to understand the attitude created in the minds of many jitney operators in Connecticut by the passage of a law at the last legislative session recognizing the public aspects of the service being given by the jitneys in that state and putting the jitneys under the control of the Public Utilities Commission. This law goes into effect July 15 and the commission has now issued certain regulations under it.

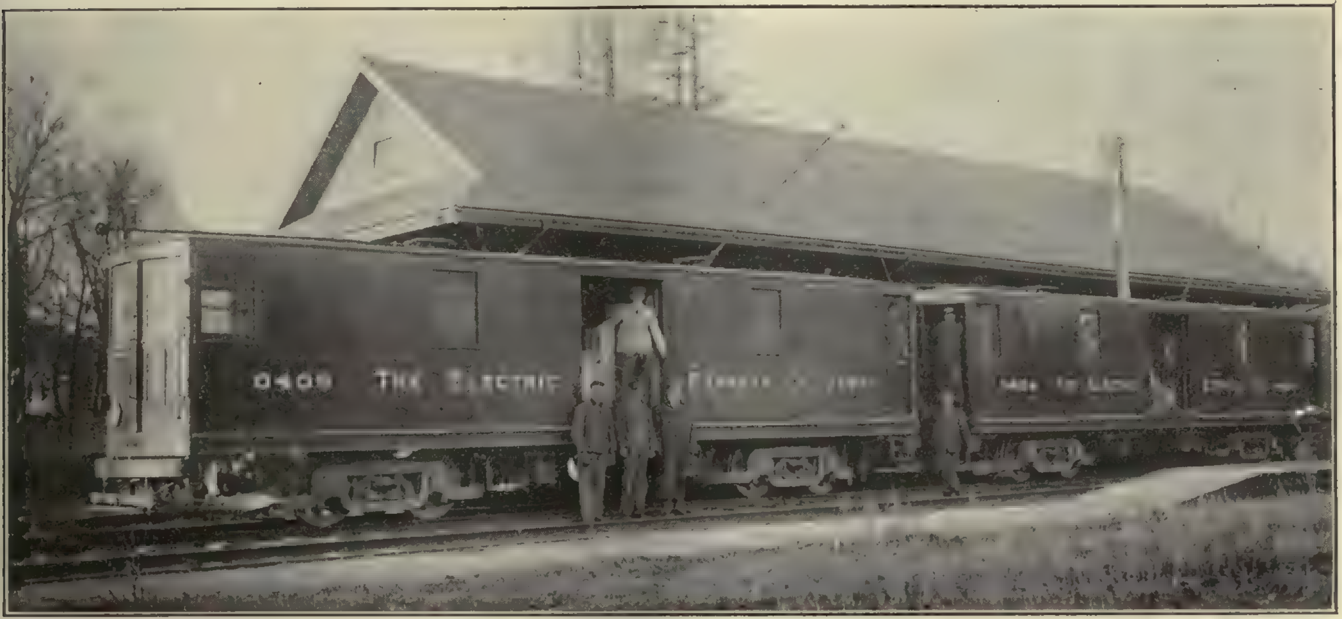
Under the new law proposed routes may be established only when proof is established of their convenience and necessity. The first decision on an application of this kind has just been rendered and in it the Public Utilities Commission of the state outlines its policy. Some of the controlling factors were held to be: (1) The general public good and the general public requirements rather than individual convenience; (2) essentiality of existing street railways; (3) stability, permanency and continuity of existing service; (4) protection of existing franchises from competition. When a commission stands for such a policy and is ready to protect existing franchises, not only for trolley lines but for steam roads, against competition that is piratical, there can be no reason for the transportation companies, the public or the municipalities served to feel that they are not going to get a square deal.

The railways, however, must not only be willing but must demonstrate that they can adequately serve the territory allotted. Of course the answer or governing index is the attitude of the public. To have the index favorable means that the trolley companies must do some real merchandising—they must put out the kind of service that will satisfy the people after it has been produced. In some cases running time can be cut, or better headways provided so as to lessen overcrowding. At least an attempt should be made to indicate to the public that its welfare is being considered. Then, too, the trolley company can add complementary bus service as feeders to existing rail lines serving territory now tapped by the jitneys, but nevertheless competing to a large extent with the trolley lines.

Undoubtedly transportation of the future will be a unified system that will utilize both trackways and highways according to their respective economic spheres.

# Trolley Freight and Motor-Truck Customers

**The Trolley Freight Systems of the Springfield-Worcester-Boston Area Hold Their Own Through Adverse Times Because of Reliability, Frequency of Service and Low Cost—Healthy Growth Attained Despite Drawbacks**



TWO MOTOR CARS IN ELECTRIC FREIGHT TRAIN

IT IS well known that the electric railways in the older, more settled parts of the United States, particularly New England, were not built with the idea of carrying anything but passengers. When they did undertake freight and express carriage they found it necessary to overcome both franchise and physical obstacles. The lack of properly equipped and located freight houses and of unimpeded track facilities proved an especially severe handicap. Therefore, it is no wonder that more than one Eastern road made but a half-hearted attempt and then quit this field. More recently the advent of the motor truck has put a further damper on such efforts.

The very truth of these statements lends all the more interest to the work of a group of electric railways which has succeeded in attaining a healthy growth despite the drawbacks of partial operation over city streets and in a district where good roads and short runs give the motor truck many advantages. This service is given in western Massachusetts and adjacent districts of Connecticut and Rhode Island shown on the accompanying map, through the co-operation of the following electric railways, practically all of which are of the combined city and highway trolley type:

1. Springfield Street Railway
2. Worcester Consolidated Street Railway
3. Interstate Consolidated Street Railway
4. Milford, Attleboro & Woonsocket Street Railway
5. Attleboro Branch Railroad
6. Boston & Worcester Street Railway
7. Holyoke Street Railway
8. Connecticut Valley Street Railway
9. Northern Massachusetts Street Railway
10. Hartford & Springfield Street Railway
11. The Rhode Island Company
12. Boston Elevated Railway

Of the foregoing lines, 1, 2, 3, 4 and 5 are under one management, with R. E. Cosgrove as general traffic agent; lines 7, 8, 9, 10 and 11 grant running rights to the service conducted by Mr. Cosgrove; lines 8 and 9 are under the direction of Leon Bolster, assistant to vice-president and general manager, while line 6, Boston & Worcester Street Railway, carries on a freight and express business under the direction of F. O. Lewis, general freight and passenger agent, including running rights into Boston Elevated Railway, line 12. The Boston & Worcester cars also may run over the other trackage of the system, but ordinarily the through service is Springfield-Worcester-Boston, as noted hereinafter, aside from the service between Worcester and Providence.

### EXTENT AND CHARACTER OF SERVICE

The distance between Springfield and Worcester is 55 miles and between Worcester and Boston 44 miles, so that the direct east-west service may be described as usually 100 miles, and the transfer service, Springfield to Providence, via Worcester, as 121 miles. The Springfield-Boston through service was not inaugurated until Feb. 1, 1921. This extension of direct carriage has stimulated business because of the elimination of transfer and rebilling at Worcester. About two-thirds of this class of traffic is from Boston west-bound.

For this through business single cars or two-car trains are run every night. Cars leaving Boston at 5 p.m. reach Springfield in time for the 7 a.m. store delivery the following day, the cars actually reaching the freight house about 3 a.m. At the Springfield end it is now customary to close the receipt of freight at 5 p.m., leave at 8:30 p.m. and reach Boston between 11 a.m. and 12 noon the next day, but arrangements are under way to assure a 7 a.m. delivery in Boston.

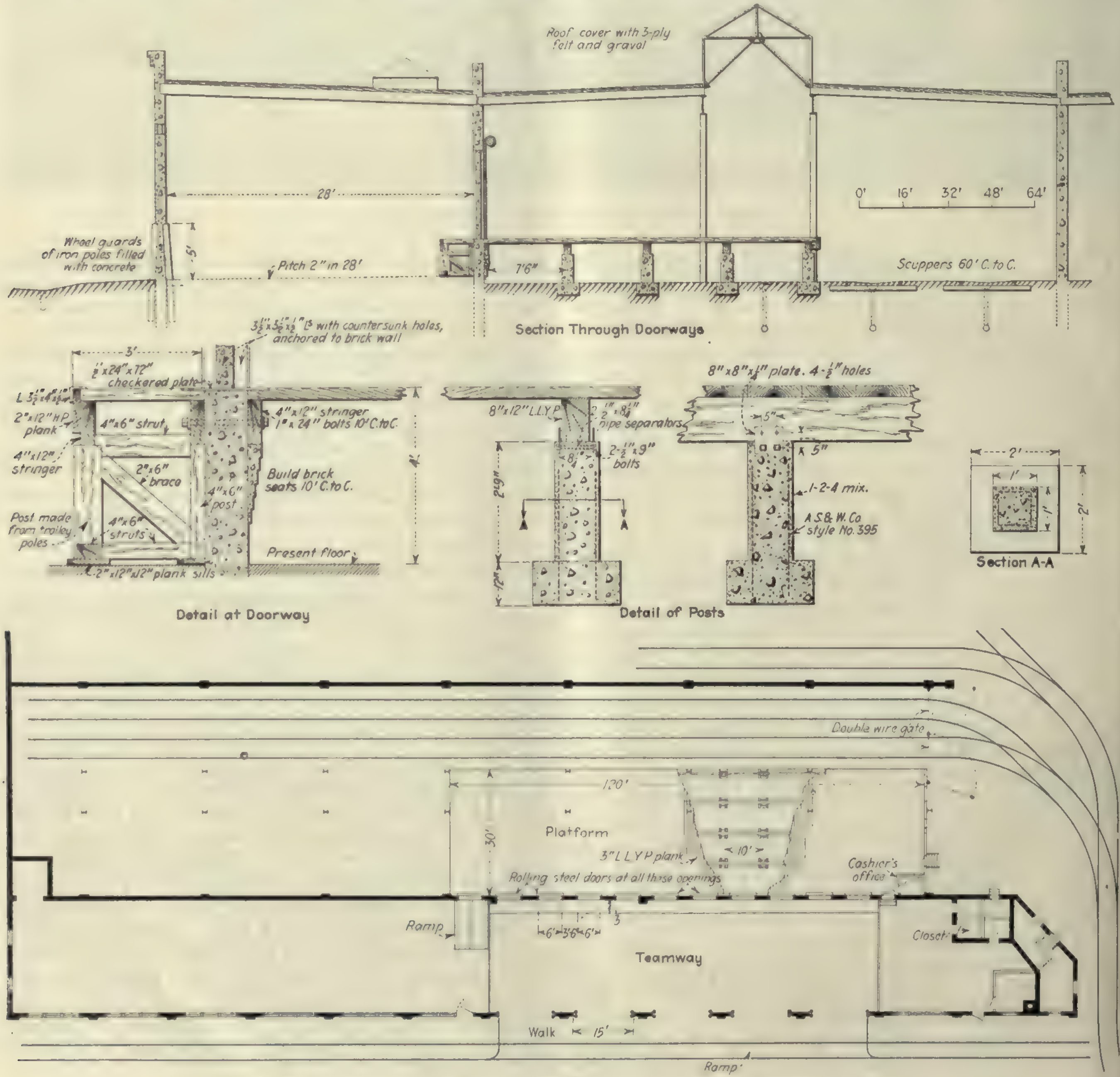
As to the service between Springfield and Worcester, trolley freight in each direction leaves regularly at

9:30 a.m. for afternoon distribution and at 8:30 p.m. for early morning distribution the following day. Since Feb. 1, 1921, a trailer has been added to the night car, because business has increased in spite of the fact that in this district the month of January, 1921, was the worst, industrially, in many years. This increase began before the industrial depression, owing to dissatisfaction with the rates and service of the steam railroads.

Two cars a day are run between Worcester and Providence to take freight transferred from Springfield. The connections are such as to permit delivery on this 121-mile run within twenty-four hours.

### MOTOR TRUCK AND EXPRESS MEN ARE GOOD CUSTOMERS AND BUSINESS SOLICITORS AS WELL

Paradoxical as it may appear, the best business solicitors for the trolley freight service are the motor truckers in this district. These operators solicit motor-truck shipments for New York and other distant points, but request that the shipper use the trolley freight as far going south and west as Springfield, 145 miles from New York! The explanation of this paradox of electric railway for short haul and motor truck for long haul is simple. Those motor truckers, who have survived through the lean months that have followed the war fever and steam railroad embargoes, realize that they cannot compete in rates with the frequent-service trolley for such runs as Boston-Worcester, 44 miles, and Worcester-Springfield, 55 miles. Nor is their advantage in speed of any importance against the over-night delivery mentioned. On the other hand, the steam railroads are still most uncertain in their handling of less-than-carload freight. Hence a shipper who is willing to pay extra for speed will engage a motor trucker. The latter makes a flat over-all rate, including that portion of the trip via trolley. The rate charged to the customer is approximately first class or express, but that which the truckman pays over the electric railway part of the run may be third or fourth class or some extremely low commodity rate. Thus the motor-truck operator is sure of a clear profit for



PLAN AND CROSS-SECTION OF BOND STREET FREIGHT STATION AT SPRINGFIELD, MASS.

possibly one-third of the run, which profit gives him a working margin to permit quoting an over-all rate of, say, 1 cent a mile per 100 lb.

With the great let-down in the demand for goods of any and every description, the motor trucker is no longer able to secure full loads and top prices. Aside from this, he has to meet the competition of furniture movers and others who take a good load one way and in their eagerness to return with a load underbid the concern which is trying to conduct a regular common carrier business. On the whole, therefore, the electric railways in this combination have no fear at all of the motor truck. Indeed, they are prepared to and do give space in their freight houses to motor truckers because of the business which they solicit for shipment by electric railway in its originating or final stage.

The old-time expressmen in Springfield and Worcester are also good solicitors for electric express. As in the case of the motor truckmen, their advertisements, which read "Direct Service to ——," etc., are to be taken with several saline grains, as they are glad to make use of the electric railway freight facilities for remarkably short distances. In fact, the most experienced operator at Springfield does not hanker for motor trucking in retail delivery for distances beyond 8 miles if his light trucks can radiate from railway stations. These operators were among the first users of motor trucks, but unlike the irresponsible individuals who entered motor haulage during the war, they are used to keeping books and know just what they can afford to charge for their services. The use of the electric railway by such operators to the extent of free space in the freight house and special cars (as at Worcester) is evidence on the relative cost of haulage by truck and electric of more importance than a ton of statistics.

A more difficult problem for the electric railway freight agent is that of securing the business of wholesale firms who look upon the operation of motor trucks carrying their names from an advertising standpoint as well as from a delivery standpoint. In many cases the advertising argument prevails even when it is admitted that the electric railway, or the electric railway plus local motor truck short haul, would be cheaper than the through service and would be fast enough for all regular operations. In several cases the shipper has given up motor trucking with his own fleet, either purchasing the services of motor truckers at a saving to himself or making use of the electric railway where convenient. It goes without saying that much private-firm trucking is wasteful because of the comparatively small loading, so that it is only a question of time as to when the novelty feature will wear off and make way for clear economics.

FRONT OF THE ORIGINAL SPRINGFIELD FREIGHT HOUSE

It would hardly be profitable to list the variety of business done by trolley freight in this district, but some of the more unusual operations may be mentioned. For example, the jewelry manufacturers of the "Attleboros" in Massachusetts use trolley freight for direct shipments from factory to pier at Providence, Rhode Island. Again, there is the carriage of blooded horses and prize cattle from fair grounds to fair grounds as a proof of prompt and careful transportation service. As shown on the map, the electric lines reach a number of towns that have no direct steam railroad service. This condition has developed considerable business in the switching of steam freight cars. Boston & Albany cars are taken at Palmer for Brimfield and other points to Southbridge, while New Haven Railroad cars are taken at Southbridge for Charlton City and Charlton.

An example of the highly economical service possible through electric freight is afforded in the case of the Holyoke Street Railway. Early in 1921 the management of the Holyoke system outbid a con-

ELECTRIC LOCOMOTIVE AND CARS AT SOUTHBRIDGE, MASS.

Teamway in Bond Street Terminal—Interior of the Bond Street Terminal. The Width of the Platform Between Electric Cars and Motor Trucks Is Only Fifty Feet

tractor who uses motor trucks for the business of supplying trap rock and gravel for the bridge under construction over the Connecticut River at Springfield. The rock comes from the Holyoke company's quarries at the foot of Mount Tom, 11 miles from the point of use, whereas competitive quarries are at Westfield, only 7½ miles distant via the Boston & Albany Railway and the public highway. The gravel from the Holyoke system is taken at South Hadley, 13 miles away, which is about the same distance as the competitor's pit at North Wilbraham.

The contractor was using 5-ton trucks carrying 6 to 10 tons of rock, whereas the cars illustrated carry 24 tons of rock or 18 cu.yd. of sand. It is estimated that 3,500 carloads of material will be required for this job. In spite of the surplus of idle motor trucks in this territory, the trucks could not possibly meet the cost of transport possible with the trolley. This is clear from the fact that the entire haul costs but $1 per ton of rock or per cubic yard of sand.

### Rates Are Attractive Yet Sensible

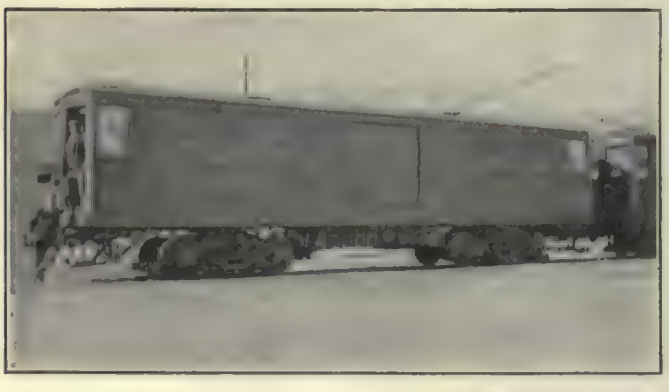
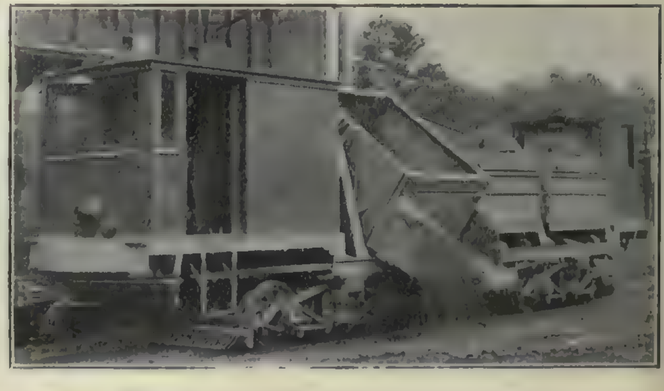
Generally speaking, the electric railway rates in this district were higher than steam railroad on the first, second and third-class categories. The electric railways took earlier increases parallel with steam railroad increases up to 20 per cent over pre-war rates. However, they have not followed the 40 per cent increase made by steam railroads in March, 1920, except in part for hauls in excess of 20 miles. The electric rates have always been lower than motor trucks could possibly meet, except in special services like carriage of household goods, for which the railway properly charges double rates and which are particularly suited for the motor trucks because of the desirability of minimum rehandling. It has already been pointed out that experienced motor truckers doing a common carrier business are glad to make use of the trolley freight as a source of revenue to themselves.

Milk is one item that has always enjoyed an exceptionally low rate. The Springfield company charges only ¼ cent per quart on a 26-mile haul for delivery to a Springfield creamery. In warm weather one advantage of milk carriage by trolley is that it arrives as milk and not as butter. Byproducts of milk also enjoy exceptionally favorable rates. It may be mentioned here that several years ago Mr. Cosgrove made the fertile suggestion that through the aid of trolley freight it would be practicable to establish municipal milk and coal stations, which would help to reduce the cost of living through the reduction of haulage expense and the elimination of duplicate or overlapping competitive routes. In his opinion, the time is coming when the present waste in goods carriage—particularly as regards trucking in cities—will have to go.

The trolley companies are popular with the shippers, not only because of more frequent service but also because of greater liberality in credits, weekly credits being the rule in contrast with the two-day limit of the steam railroads. Naturally, the electric railway group is also more closely identified with the local interests of the territory.

### Facilities

Outside of the cities, the Springfield and Worcester systems are of the usual country trolley type, namely, single track with sidings. As is the case in Worcester today, freight cars entering Springfield formerly had

Two Types of Rolling Stock Used

Two Views of the Worcester Freight Terminal. The Freight Houses of the Springfield and B. & W. Face Each Other on Opposite Sides of a Broad Teamway

to come in and go out over the main travel-ways of the passenger cars. In 1920, however, the Springfield Street Railway built within that city 4 miles of single track with five turnouts. For the time being, this track is being used exclusively for uninterrupted entrance and exit of freight cars.

The Boston & Worcester Street Railway is somewhat better situated as regards the through run and the Worcester end. It is constructed as a high-speed, double-track line on reservation for 20 miles in the center of the public highway and on an absolutely private right-of-way for another 14 miles. Thus it has 34 miles of clear track out of 44. The 2 miles in Worcester do not constitute a handicap because they do not extend into the business center, but at the Boston end it is necessary to operate over 8 miles of city streets, although some of the track is on reservation. The running time for the 44 miles between Worcester and Boston is two and one-half hours, but the schedule allows for three hours.

The Holyoke and Providence connections of this group also lack the advantage of direct right-of-way entrance into the cities. Nevertheless, they hold their own with any kind of competition; all the more so since the establishment of through connections with the Holyoke and Boston & Worcester companies for shipments from Springfield and Worcester or vice versa.

As shown in an accompanying halftone, the Worcester freight houses of the Springfield and Boston & Worcester companies face each other from opposite sides of a broad team and truck way. Vehicles bringing or carrying off goods simply back up against the platforms and are loaded or unloaded with an astonishingly small amount of trucking, since the longitudinal design of these buildings makes it possible to bring the teams and trucks very close to the "center of gravity" of the load to be transferred. The general scheme of the larger houses is illustrated also by the accompanying plan of the Bond Street building at Springfield. This house was altered to its present purpose in June, 1919. It has a covered teamway into which a dozen motor trucks can back at one time against the freight platform. This platform is only 50 ft. wide, so that it is an easy matter to transfer freight to or from the cars, which are set out, according to their destination, on two tracks on the opposite side of the platform. Both tracks can be loaded or unloaded simultaneously by making use of the doorways of the cars on the inner track. Much of the freight is moved no further than the width of the platform and possibly the first track, the rest being stacked in sections reserved for different destinations on the system. This building succeeded a most inconvenient structure which could handle only three or four wagons at a time.

Another halftone shows a typical intermediate station where there is a regular agent. At points of lesser importance store agents are engaged for $2.50 to $10 a week fees to take care of any business. No agents are employed on a commission basis, nor is there any solicitation staff as yet outside of the volunteer work of the motor trucker and expressman.

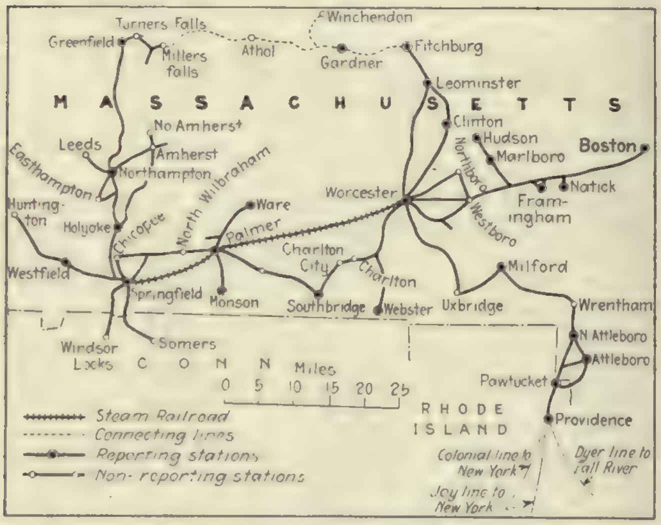
### Rolling Stock and Staff

The cars used in freight and express service by the Springfield-Worcester companies comprise thirty-two motor cars, three trail box cars, two dump cars and two trailers for trap rock, sand and gravel business, eight double-truck freight cars for lumber, etc., and three electric locomotives, used chiefly for hauling steam freight cars. The latest standard motor car weighs 55,000 lb., has four 65-hp. motors and can

Two Typical Intermediate Electric Freight Stations carry 60,000 lb., the average less-than-carload loading being 40,000 lb. These cars are equipped throughout with M. C. B. couplers, improved air brakes, etc. Cars for carrying perishable goods are heated electrically —a strong argument for securing that kind of traffic in winter, aside from the greater winter reliability of the electric railway.

Economy in man-power with trolley freight service is attained not only through the greater capacity of the individual cars but also in train operation. A two-car and even a three-car train has but one motorman and one messenger. Usually, one car in a train is a sealed car for some one consignee or terminal. The messengers do a certain amount of delivery to store doors. As a rule, Springfield-Worcester crews cover all of the system served—approximately 290 miles single track in freight service—except that Boston & Worcester crews take charge during the run between those two cities.

For taking on steam cars at Palmer no extra crew is required. On the Attleboro Branch Railroad switching is done with crews borrowed from the passenger department.



MAP SHOWING BOSTON-WORCESTER-SPRINGFIELD FREIGHT SYSTEM

Economy in the use of labor is essential as the men are paid on the minimum nine-hour day basis at 65 cents an hour with overtime, earning a bonus of one hour for lunch. On the Springfield-Worcester system the line-up of freight-express employees is as follows:

| | Springfield | Worcester Consolidated | Milford, A. & W. |
|---|---|---|---|
| Freight handlers | 3 | 5 | 0 (agent does work) |
| Messengers | 11 | 10 | 4 |
| Motormen | 11 | 10 | 4 |
| Foremen | 1 | 2 | 0 (agent is foreman) |

Messengers, like the motormen, get 65 cents an hour; freight handlers, 51 cents; foremen, $38.57 for a six-day week. The first car goes out at 7:30 a.m. from Springfield, the last at 11:30 a.m. Crew labor does most of the loading. The gross revenue from freight and express so far as the Springfield-Worcester lines (exclusive of Boston & Worcester Street Railway) is concerned has been as follows:

| | |
|---|---|
| 1920 | $318,135 |
| 1919 | 264,681 or $53,454 less than 1920 |
| 1918 | 246,150 or 18,531 less than 1919 |
| 1917 | 220,210 or 25,940 less than 1918 |
| 1920 | 97,925 ahead of 1917 |

Business in 1920 would have shown a larger increase over 1919 except for the extreme blizzard of February, when the freight equipment was impressed to fight snow. In the lesser snowstorms of Feb. 22, 1921, the motor trucks deserted, with the result that Feb. 23 was a banner day for the electric railway.

### GENERAL COSTS OF SPRINGFIELD-WORCESTER LINES

During the year 1920 the Springfield-Worcester lines operated 398,700 freight car-miles for $288,539, or 72.37 cents per car-mile. On the basis of $318,135 gross earnings, the gross earnings per car-mile were 79.79 cents, leaving a net revenue of 7.42 cents per car-mile. The operating ratio was 90.7 per cent. The departmental charges are given below.

TABLE SHOWING ANALYSIS OF COST OF FREIGHT OPERATION

| Item | | Per Cent of Freight Rev. | Note |
|---|---|---|---|
| Maintenance of way | $29,159 | 9.17 | This charge is the proportion which freight earnings bear to passenger earnings, although only one-third of trackage is used for freight. |
| Maintenance of equipment | 16,058 | 5.05 | Amount actually spent on upkeep of freight equipment. |
| Power | 27,872 | 8.76 | This works out at 7 cents per car-mile. Tests show less than 3 kw.-hr. per c.-m. Springfield power costs 1.1 cent per kw.-hr. at substation and Worcester 1.5 cents. |
| Conducting transportation | 183,756 | 57.76 | Amount actually paid and includes $60,992 for station employees and $4,296 for station expenses. |
| Traffic (advertising, etc.) | 5,826 | 1 83 | |
| General expenses | 25,869 | 8.13 | |
| Total expenses | $288,539 | 90.70 | |
| Net operating revenue | $29,597 | 9.30 | |
| Taxes $4,295 and interest on investment $22,587 | $27,512 | ..... | Interest on investment includes estimated car-mile proportion, although freight equipment avoids operation over expensive special work in cities. |
| Surplus | $2,285 | ..... | |

When 1920 results are considered, it is to be borne in mind that not only was the freight equipment used to fight snow to keep the lines open for passenger service, but that the cost of snow-fighting was assessed against the freight department on a pro rata basis.

With regard to the general degree of care shown in the transportation of goods by trolley freight, the following figures on losses due to damage to goods in transit in percentage of gross revenue is of interest:

| | Per Cent | | Per Cent | | Per Cent |
|---|---|---|---|---|---|
| 1920 | 0.59 | 1919 | 0.58 | 1918 | 1.38 |
| 1917 | 0.76 | 1916 | 0.37 | 1915 | 0.29 |
| 1914 | 0.24 | | | | |

Exclusive of the Boston & Worcester Street Railway, there were carried in 1920 approximately 262,000 tons, with an average gross earning of $1.20 per ton.

### THE BOSTON & WORCESTER STREET RAILWAY

The present rolling stock of this high-speed line between Boston and Worcester consists of twelve 45-ft. motor cars and eight 40-ft. trailers, all equipped with M. C. B. radial draw-bars, automatic air brakes and GE-263-A motors (on Brill arch-bar trucks) geared for heavy loads rather than speed. As noted earlier, the run of 44 miles is made in two and one-half to three hours. There are few intermediate stops.

This standardized freight equipment succeeds miscellaneous stock that could not make good for the specialized needs of freight service. Trains of one motor car and two trailers have been run frequently and tests have been made with trains of two motors and two trailers.

The company's business has increased steadily, even through the flood period of unrestricted motor trucking, as indicated by the following comparison:

1916 gross earnings were 75 per cent above 1915
1917 gross earnings were 35 per cent above 1916
1918 gross earnings were 22 per cent above 1917
1919 gross earnings were 40 per cent above 1918

1920 gross earnings broke even with 1919 instead of going ahead because the freight and express equipment was used for snow-fighting during February and March, 1920. Motor trucks ran over the company's reservation as soon as it began clearing the snow away.

Because of the extraordinary conditions of 1920, Mr. Lewis suggests the following analysis of 1919 operations as giving a truer picture than 1920:

TABLE SHOWING FREIGHT EARNINGS AND EXPENSES FOR YEAR 1919 BOSTON & WORCESTER STREET RAILWAY

| | | |
|---|---|---|
| Gross income | $233,810 | |
| Less payment of $25,190 to Boston Elevated Railway and of $10,186 to Worcester Consolidated Street Railway and $1,242 special expense for trucks used during Boston Elevated strike in July, 1919 | 36,618 | |
| | | $197,192 |
| Expenses | | |
| Conductors and motormen | $35,550 | |
| Freight station and miscellaneous expenses | 69,882 | |
| Transportation expenses | 67 | |
| Station expenses | 9,656 | |
| General expenses | 260 | |
| Loss and damages (equal to 1.46% of gross revenue) | 3,426 | |
| Superintendence and solicitation | 1,542 | |
| Printing and stationery | 2,141 | |
| Advertising | 65 | |
| Maintenance of equipment | 6,643 | |
| Maintenance of buildings | 40 | |
| Insurance | 840 | |
| Power and trackage | 1,695 | |
| Total | | $131,807 |
| Net | | $65,385 |
| Total freight handled, tons | | 68,142 |
| Total freight ton-miles | | 1,705,817 |
| Total freight car-miles (of which 53,371 were trailer) | | 259,228 |
| Average gross revenue per ton | | $3.43 |
| Average net revenue, per ton | | 0.96 |
| Gross revenue per ton-mile | | 0.137 |
| Cost per ton per mile | | 0.098 |
| Gross revenue per car per mile | | 0.902 |
| Cost per car per mile | | 0.649 |
| New revenue per car per mile | | 0.253 |
| Net revenue per mile of road | | 1.580 |
| Miles of line operated | | 41.30 |

When the foregoing surplus figure is contrasted with that of the Springfield-Worcester lines, it is well to bear in mind that the latter have been assessed for track and power expenses on a different basis. Thus, the combined way and power charge for 398,700 car-miles was $57,031, whereas the Worcester Consolidated operation of 259,228 car-miles is assessed only $1,695 for the same items. The item "General expenses" is another which shows a great difference in the freight accounting practices of these properties.

## Baking Soda Quenches Fire

AN EXTRAORDINARY case of spontaneous combustion occurred in an embankment fill on the Cleveland & Eastern Traction Company's lines at Chardon, Ohio. The effective method employed to extinguish it was outlined in the *Black Diamond* recently by J. A. Thomas, the consulting fire engineer. The fill was formerly a pine trestle, about 300 ft. long and 30 ft. deep, which was later filled in with 200 cars of cinders, containing more or less combustible. A top dressing of about fifty cars of furnace slag practically sealed the embankment. The fill, fired from spontaneous combustion, became a mass of fire after it had been burning about six months. It was then arranged immediately to extinguish the fire with plain baking soda and water. After the soda solution had been pumped into the burning fill for about two days the fire was finally extinguished throughout the embankment. Had plain water been used enough would probably have been necessary to have washed the entire fill down into the valley.

# Five and Ten-Cent Boston Fares

### Account Given of How the Two Rates of Fare Are Collected in Everett and Malden Divisions of Boston Elevated Railway—Plan Has Met with General Approval

BY EDWARD DANA

General Manager Boston Elevated Railway

THE trustees of the Boston Elevated Railway have recently placed in operation a local fare of 5 cents for riders in the cities of Malden and Everett. This fare does not include the privilege of a free transfer and is entirely separate and distinct from the 10-cent fare for traffic from these two cities to the center of Boston or any other point upon the Elevated system, which comprises some 535 miles of surface railway and elevated railways.

The present article is written for the purpose of explaining the facts in order that a correct understanding may be had of what the plan involves.

In view of the fact that local conditions absolutely govern the application of a rate of fare on a street railway, the mere statement of the unit of fare in a city in terms of United States currency means nothing for purposes of comparison with another city unless all factors are considered in both localities. One cannot compare the tax rate of cities in New England, Florida or California and secure advantage from doing so without taking into consideration at the same time the different factors and conditions. This same thing is true on fares. When people compare on the basis of difference in cents, it is indicative of the superficial manner in which conclusions are arrived at. Even men in this industry have not been free from such comparisons.

COMMUTERS GOING CITYWARD. VIEW AT 8 A.M. ON EVERETT STATION PLATFORM

The cities of Malden and Everett are typical of such Massachusetts communities. While certain areas are given over to industrial activity, they are essentially residential, with well-defined centers near which are located substantial local stores, theaters, etc. They occupy an area of approximately 8½ square miles lying in the area from 3 miles to 6 miles from the center of Boston.

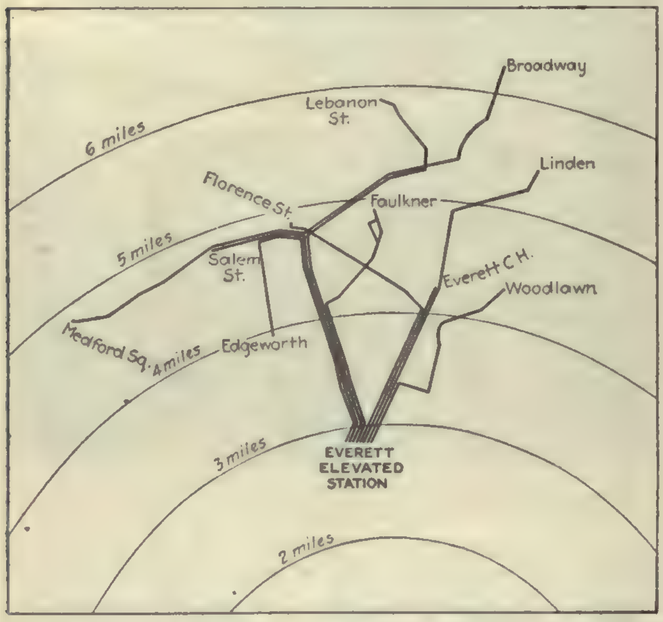
The combined population is 89,000, and as the centers of the two cities are only 1½ miles apart from a transportation standpoint they occupy a single section of territory tributary to the end of the main line of the elevated at the Everett Terminal and are really one city.

All of the surface lines operated in these cities run to the Everett Terminal, there being no through routes to Boston. At this terminal passengers change to the elevated trains. There are 32 miles of track in the streets of these cities and eight regular routes are operated, the average length of route being 3 miles. In the course of a day 5,100 miles are operated by 795 trips on these eight routes.

The total volume of traffic handled per day amounted to 63,000 in both directions. Of this amount 55,000 was so-called tidal traffic, or in other words Boston bound traffic, and the balance local rides within the district. When the fare advanced to 10 cents, undoubtedly the greatest proportion of loss of riders occurred in this local travel where people had formerly ridden for relatively short distances to points of concentration within these cities.

### How the Fares Are Collected

The plan adopted contemplated an entire physical separation of the collection of the fares for through traffic from local traffic. On the trip inbound, or in the direction of Boston, the pay-leave plan is used. Local passengers, or those leaving the car before it enters the inclosure at the Everett station, drop 5 cents in the conductor's fare box as they leave the car. Through passengers to Boston leave the surface car after it has stopped at the Everett station platform and drop 10 cents in the station collector's fare box. On the outbound trip the only fares which have to be collected on the surface cars are the local fares, because the outbound through passengers paid their fares at the intown stations of the Elevated and entered the car within the Everett prepayment inclosure.



Map Showing Routes in Malden and Everett—Distances Shown Are from Scollay Square, Boston

With this physical separation of passengers paying different rates of fare it was a simple matter to place in effect any fare that might be decided upon for the local rides. It was decided to experiment with 5 cents because of the convenience and the incentive for local rides to be increased. Conductors on the cars today have the collection of only local fares.

The plan has been in operation some weeks and while in one section a jitney is operated which provides a frequent service, nevertheless the increase in local rides has been somewhat over 80 per cent. It is anticipated that the jitney situation will be worked out satisfactorily as there has come an appreciation by the public that the jitney and the street car cannot thrive in competition. The popularity of the 5-cent fare for local rides has resulted in a constant increase which undoubtedly has had a noticeable effect on the jitney patronage. A careful survey of the traffic secured locally disclosed the fact that the average length of haul for all of the present 5-cent riders is exactly 1 mile, and this, of course, makes it very apparent why a large percentage of this traffic was lost when the fare advanced to 10 cents.

The introduction of this plan has met with general approval on the part of the community as well as the officials of these cities. There seems to have come an appreciation that an honest effort has been made to make the service more useful at no increased expense, and it has brought out from many quarters the belief that an equitable situation now exists; in other words, that the 10-cent fare for the long-haul rapid transit ride under present conditions is necessary and just and that the relatively short haul, for which the 10 cents is manifestly so high that the people can walk instead of ride, is being taken care of in a fair way by the reduced fare for these rides.

The result of the experiment will determine as to the advisability of applying the same plan further upon the elevated system for similar rides. Already a further experiment has been authorized for the cities of Medford and a portion of Somerville and for the district across the harbor in East Boston. It has been estimated that if the local traffic can be increased 100 per cent no discrimination exists as no additional burden is thrown upon the 10-cent car riders of the system and that consequently the system could be made more useful for a great many millions of people in the course of a year. If this plan were in successful operation on the system as a whole and the amount of money secured was the same from twice as many people for the 5-cent fare as for the reduced number of people for the 10-cent fare, the amount of increased travel would restore practically all the passengers shown to have been lost when the flat fare advanced to 10 cents.

## New Interlocking Installation on Boston Elevated

IN CONNECTION with a recently completed extension of its rapid transit lines from Sullivan Square, Charleston, to a temporary station in Everett, the Boston Elevated Railway has installed a new electro-pneumatic interlocking plant with alternating-current control. The machine, described in the *Railway Signal Engineer*, is so designed that a total of 159 functions is controlled from seventy-four working levers, requiring a space of 17 ft. 3 in. The principal features of the interlocking installation include semi-automatic control of all main track signals, automatic stops at all signals governing movements in normal direction of traffic on the main tracks, section locking, sectional route locking, approach locking for all main line signals governing entrance of trains into interlocking, illuminated track diagrams, light indicators on all switch levers to show whether the track section in which the switch is located is occupied or unoccupied, and an intercommunicating system between the various signal towers.

# San Francisco Rerouting Effective

### Rush-Hour Conditions on Market Street Lines of Municipal Railway and Market Street Railway Became Such that Relief Was Necessary—This Ferry Terminal Holds the World's Record in Its Class for Traffic Density

MARKET STREET is the main thoroughfare of San Francisco and car lines extend on this street from the Ferry Terminal to Twin Peaks Tunnel, running through the principal retail shopping district. The population of the municipalities on the other side of the Bay of San Francisco is about equal to that of San Francisco, and it is said that more people pass through the Ferry Terminal than through any similar terminal in the world. The car lines of heaviest travel to and from the Ferry Terminal operate on Market Street for a greater or less distance. The shortest distance before turning out is one-half mile from the Ferry Terminal, and from there the lines diverge at intervals until the last line leaves Market Street at a point more than 3 miles from the terminal.

Most of the patrons of the ferries use the street railways in order to reach the commercial center contiguous to Market Street or the outlying districts served by the lines terminating on Market Street, and the residents of San Francisco use the lines from the outlying districts to reach the commercial center on or near Market Street or to reach the Ferry Terminal. Both the Market Street Railway and the Municipal Railway operate cars on this street and four tracks are laid the entire distance of more than 3 miles, terminating in three concentric loops at the Ferry Terminal.

The greatest demands on the street railway facilities are made between 5 and 6 p.m., at which time the patrons and clerks of the mercantile establishments and the occupants of the office buildings are leaving the business center for their homes in various parts of San Francisco or for the Ferry Terminal. The major movement at this time is outbound to the residential sections of San Francisco and in the opposite direction from the travel toward the ferries. Most of this outbound traffic originates on Market Street in the mile commencing about one-half mile from the Ferry Terminal.

## JOINT USE OF STREET CAUSES COMPLICATIONS

Since the construction of the two outside tracks by the Municipal Railway and the operation of the municipal cars on the street various attempts have been made to relieve the traffic congestion and to reduce the danger of accidents. The most recent change has been to turn back some of the Market Street Railway cars during the rush hours, by diverting them to Mission Street on the upper half mile of greatest traffic, thus keeping them off of lower Market Street. This results in an increase of headway between cars and gives more time for loading the rush-hour crowd.

Traffic counts made on lower Market Street since this rerouting show that the Market Street cars of the Market Street Railway are now carrying about 26,000 passengers from the business section to the outlying districts in the hour between 5 and 6 p.m. During this time 188 cars operate on a nineteen-second headway on lower Market Street, branching out at six points on to eleven lines to serve as many sections of the city; twenty-two inbound cars are diverted to Mission Street at Sixth Street, returning to Market Street as outbound cars at Fourth Street, and eighteen cars on Eddy Street are turned back at the Market Street intersection, transferring passengers to and from other cars on Market Street instead of continuing through Market Street to the ferry as at other hours of the day.

In this same hour the Municipal Railway operates an average of 101 cars around the ferry loops. These cars operate on headways ranging from two and one-half to four minutes on each of the six lines (which branch out from Market Street at three points to serve different districts), or, taken collectively, on a thirty-six-second headway. If all cars operated on two tracks the headway would be only twelve and one-half seconds on the lower half mile. Passenger counts made at the peak of the rush indicate that the average loads carried by municipal cars range from 115 passengers per car on the "D" line to 145 per car on the "J" and "K" lines. Taken together, the six municipal lines carry a total of 10,000 to 12,000 passengers from lower Market Street during the hour from 5 to 6 in the evening.

TRAFFIC CONDITIONS AT THIRD AND MARKET STREETS, SAN FRANCISCO

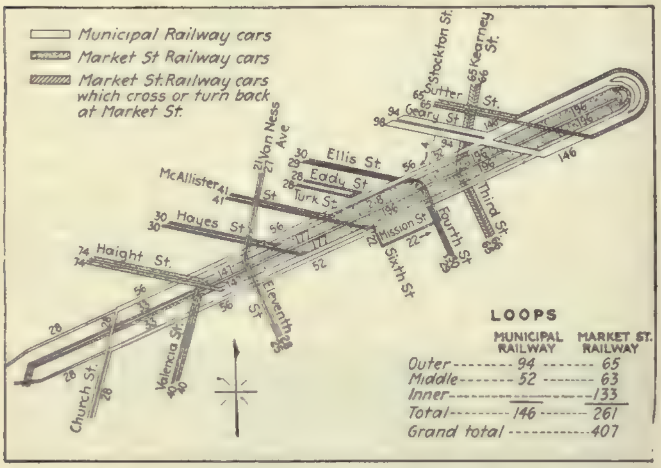
The accompanying sketch, prepared by the Municipal Railway, shows diagrammatically the operation of the cars on lower Market Street. The relative number of cars on the different sections is shown by the width of the band. The actual number for the ninety minutes of heavy traffic is shown in figures.

## INSPECTORS EXPEDITE TRAFFIC

It would be impossible to handle so many cars with any regularity without the aid of inspectors. Commencing at 4 p.m. five inspectors for the Market Street Railway, located at four points of dense traffic, devote their attention to spacing the inbound cars, so that they may arrive at the Ferry Terminal and leave outbound at proper intervals. This force is increased at 5 p.m. to seven inspectors and two inspectors acting as flagmen, at eight locations, who work the outbound cars. The work of these inspectors, together with the increased headway made by looping twenty-two cars at some distance from the Ferry Terminal, has reduced the maximum delay from ten to three minutes.

All cars are of the P. A. Y. E. type. Normally the front end is used for exit only, but during this rush hour street collectors are used at the front ends of both Municipal Railway and Market Street Railway cars in order to speed up loading. Thirteen collectors are on duty for the Market Street Railway and probably increase the average load by forty passengers.

The clearance between the cars on the inner and outer tracks is a factor in the situation. The tracks are 11 ft. ½ in. between centers, which gives a clearance of only 1 ft. 4 in. between grab handles, window sills, etc., when the largest cars are passing. Passengers waiting to board the cars of the Market Street Railway on the inner track stand in this narrow space, while the municipal cars are passing on the outer track. There is also the serious predicament of a person caught standing on this "devil strip" when cars are moving in the same direction on the inner and outer track and the platform of the car on the inner track is so crowded that passengers are standing on the steps and thus occupy a considerable portion of the 1-ft. 4-in. space.



SCHEDULE OF CAR OPERATIONS ON MARKET STREET, SAN FRANCISCO, DURING RUSH HOURS: 4.30 TO 6 P.M.

The difficulty and danger incurred by passengers in crossing the line of team and automobile traffic and then crossing the track of the Municipal Railway hinders and slows down the loading of the cars of the Market Street Railway, especially since so little space is available for standing between the car lines, and many people hesitate to take this risk. If a patron, desiring to board a car of the Market Street Railway, does not do so very promptly, the municipal cars moving on the outside track cut off access to the cars on the inner track until the latter have proceeded, and it is necessary to wait for the next car. In order to maintain headway, it is imperative that the Market Street Railway cars limit their stops for loading passengers to the shortest possible time, due to the large number of cars operating at such short intervals on Market Street and the vehicular traffic to be taken care of at the numerous cross streets.

The Market Street Railway cars with longitudinal seats are found to be particularly well adapted to the traffic of the rush hours on Market Street. These cars handle a volume of business that would never be possible without the 6-ft. aisle down the center of the car, which a seat arrangement of this kind affords. Moreover, the ready access which this arrangement provides to the ample standing room inside the car is a factor of special importance on lower Market Street because it aids rapid loading. Anything which decreases the length of stops is regarded as of primary importance in improving the service, because officials of the Market Street Railway point out that the complaints are much less likely to come from failure to obtain a seat than from delays in the schedule. The twenty new cars recently added to the Market Street Railway equipment have the seats in the inside section built longitudinally.

## Regulations for Jitneys

### Text Given of Connecticut Rules, Which Go Into Effect July 15—Jitneys Made Common Carriers, Under Jurisdiction of Public Utilities Commission

UNDER Chapter 77 of the Public Acts of 1921, which takes effect July 15, 1921, all jitneys operating in the State of Connecticut are made common carriers and subject to the jurisdiction of the Public Utilities Commission. The term "jitney" as defined by the act includes any public service motor vehicle operated upon any street or highway in such manner as to afford a means of transportation similar to that afforded by a street railway company, by indiscriminately receiving or discharging passengers or by running on a regular route or any portion thereof or between fixed termini.

In order that there may be some consistency as to the operation of these vehicles where allowed by a certificate of convenience and necessity, rules have been established, subject to changes as the commission may subsequently find necessary.

These rules provide that certificates to operate can be revoked for violation of traffic ordinances or state laws regarding the operation of motor vehicles and that ownership certificates of operation are not transferable without the approval of the commission. Operators are required to display destination and route signs on the fronts of cars. These signs must have letters not less than 2 in. nor more than 3 in. in height and must be illuminated at night. Vehicles having a seating capacity of ten or more must permanently display on each outer side a notice stating the seating capacity. The letters used are required to be 2½ in. high.

Jitneys certified to operate must reasonably maintain the prescribed schedule and must post in a conspicuous place inside of each car a time table of the entire service prescribed, together with the rates of fare. This service cannot be reduced without the approval of the commission nor is any deviation from the route specified allowed except in case of emergency. All cases of interruption of the service, as required by certificate, for a period of twenty-four hours must be reported to the commission, together with the cause. In case of suspension of service for a period of five days the certificate of operation is automatically revoked unless the operator is excused for cause by the commission.

Jitneys can be operated only at a speed consistent with safety, depending on congestion of street traffic, danger of intersecting streets, curves, street railway crossings or other conditions requiring extra caution. In suburban service the speed may be greater than that maintained in urban territory, but must not exceed 20 m.p.h. for vehicles having a seating capacity of ten or more passengers, nor more than 30 m.p.h. for all other vehicles. Before crossing tracks of steam railroads at grade jitney operators must carefully observe warning signs and proceed over the tracks with due caution.

All cars must be equipped with a speed indicator.

Owners or operators are not allowed to solicit passengers by outcry or other noise, nor can an operator collect fares, make change, take on or discharge passengers while his vehicle is in motion. Passengers are to be received or discharged at the curb, when it is accessible, and at no other place.

Operators are not allowed to smoke while on duty, nor to transport any dangerous, explosive or inflammable substance except fuel for the locomotion of the car, and this fuel must be carried in the tank provided. Articles left in the cars by passengers must be reported to the commission, if they remain unclaimed for a period of more than twenty-four hours, with information as to where such articles may be recovered.

All cars must be maintained in a neat and sanitary condition and be lighted on the inside at night. The commission's memorandum certificate or at least a certified copy thereof must be posted in a conspicuous place in every vehicle.

## Living Costs Drop in Akron

### Brief Compiled for Use in Arbitration of Wages by the Northern Ohio Traction & Light Company Shows Comparison Between 1920 and 1921

BETWEEN April, 1920, and April, 1921, the buying power of the dollar so increased in Akron, Ohio, that a salary of $1,420 in 1921 was equivalent to a salary of $2,000 in 1920. These figures are shown in a compilation made of living costs in Akron, Canton, Massillon and Dover by the Northern Ohio Traction & Light Company and submitted in arbitration proceedings on the wage question.

The company first shows the principal commodities in the family budget, with the United States Labor Bureau apportionment, and the percentage of decrease with the corresponding increase in the buying power of the dollar. It then shows how the reductions are applied to a $2,000 family budget. (See table.)

TABLE SHOWING LABOR BUREAU BUDGET FOR $2,000 INCOME AND REDUCTION IN COSTS IN AKRON BETWEEN APRIL, 1920, AND APRIL, 1921

| | U. S. Labor Bureau Distribution | | Under Akron Conditions, April, 1921 | |
|---|---|---|---|---|
| Food | Apportionment, Per Cent | Amount | Reduction, Per Cent | Amount |
| Food | 43 | $860.00 | 31.275 | $591.25 |
| Shelter | 18 | 360.00 | 27.03 | 236.77 |
| Clothing and dry goods | 13 | 260.00 | 37.012 | 189.73 |
| Light and heat | 6 | 120.00 | 12.11 | 105.46 |
| Sundries | 20 | 400.00 | 25.74 | 297.04 |
| Total | 100 | $2,000.00 | *28.99 | $1,420.25 |

* Average.

Figures on food were obtained from local dealers whose names are given in a list. To obtain figures on clothing was somewhat more difficult, due to changes in grades, but percentage figures were obtained in a number of cases. They show that in women's clothing hosiery prices declined 31.43 per cent, underwear 36.55 per cent, silks 35.75 per cent, woolens 42.55 per cent. The decline in women's suits, dresses and skirts averaged 33.09 per cent. The average decline in dry goods was 43.68 per cent. Shoes declined from 26.88 per cent to 66.88 per cent during the year and the reductions were greater in men's than in women's shoes.

The figures on shelter or rentals relate particularly to the territory and districts in which trainmen in the employ of the company reside and in general apply to houses ranging from $20 to $35 a month. The report points out, however, that this reduction does not apply to those who own their homes or are buying homes on the monthly installment plan. For these families shelter costs have, in fact, slightly increased, as taxes are somewhat higher than a year ago, due to an increase in the assessed valuation. The percentage, however, when applied to the total shelter cost is not material in fixing final living costs. Room rentals have declined in about the same proportion as house rentals.

Electric and gas rates have neither declined nor advanced during the year, but coal prices have dropped from an average of $9 per ton to an average of $7.91 per ton, making a decrease of 12.11 per cent.

Under sundries, furniture, drugs, kitchen utensils, face powders, soaps, etc., were considered among other articles of family use. On these the report says: "Drugs and furniture were on the increase prior to April, 1920. Following that came a decrease of 20 per cent in drugs and a 10 per cent decrease in furniture. A 20 per cent additional decrease was noted after January, 1921. Kitchen utensils showed a decrease of 10 per cent to 25 per cent, and soap 20 per cent. The general average decline in sundries from April 30, 1920, to April 30, 1921, is 25.74 per cent."

In its conclusions the report states that from present forecast wholesale prices will tend downward for most of the remaining months of 1921, although unquestionably at a slower rate than heretofore, and "normalcy" should be reached by Jan. 1, 1922. Continued price declines are being reflected daily in food, clothing and sundries. House rents at present do not give any evidence of further reduction, and it is quite probable that the present level will continue until housing facilities are increased. Coal prices are not expected to show any material decline for some time.

The report is accompanied by a series of charts and tables relating to local prices.

## Bus Substitute for Early Cars

TO SAVE coal the Edinburgh Tramways, which is a municipal enterprise, has discontinued the operation of cars on certain routes in the very early morning hours and has substituted therefor motor buses.

BUS USED BY EDINBURGH TRAMWAYS IN EARLY MORNING HOURS TO SAVE COAL

The accompanying engraving shows one of the tramway department buses at the Newhaven fish market near Edinburgh. As shown, the bus is a single decker with inclosed rear platform. It carries seats for thirty-one passengers.

# Letters to the Editors

## *Traffic Regulation Has Its Difficulties*

PUBLIC UTILITIES COMMISSION
STATE OF CONNECTICUT

HARTFORD, June 23, 1921.

To the Editors:

On page 1149 of the issue of June 18 is shown a photograph of a safety zone in Los Angeles. The text says that the entrance to this safety zone is up at the corner, but, contrary to the practice of safety, I notice that one man is stepping over the chain and a lady is walking between automobiles and around the end of the zone instead of entering the zone at the point of entry. The disregard of the safety zone limits by pedestrians makes it very hard for the police authorities to make proper rules regulating movement of motor vehicles.

E. IRVINE RUDD,
Chief Engineer.

## *Self-Corrosion, Not Stray Current Electrolysis, at Selkirk, Manitoba*

WINNIPEG, MANITOBA, June 24, 1921.

To the Editors:

In the ELECTRIC RAILWAY JOURNAL for March 26, 1921, the writer's article "Electrolysis Mitigation in Winnipeg" contained a reference to the self-corrosive action of the so-called alkaline soils of western Canada on cast-iron pipe. Recently some conspicuous examples of such self-corrosion were found on the water supply system of the hospital at Selkirk, Manitoba, at points and under conditions quite outside any possible path of stray current from railway or other power circuits. The pipe affected was a 6-in. water main and the active cause was undoubtedly the alkaline salts in the soil.

The self-corrosion discovered corroborates the result of laboratory experiments conducted by the writer.

Similar laboratory experiments were reported in 1914 by E. H. Scofield, power engineer of the Twin City Rapid Transit Company of Minneapolis, in the ELECTRIC RAILWAY JOURNAL, including an account of the perforation of a 4-in. cast-iron pipe by soil corrosion in a Dakota town where there had never been a trolley system, and showing a photograph of the pipe. At that time it seemed that most of the experts on electrolysis investigation were so bent on tracing the cause of pipe corrosion to stray current wherever there was an electric railway which could possibly be blamed for it, that Mr. Scofield's presentation did not appear to make much of an impression. However, the subject of the corrosion of iron has in the meantime been continuously studied by competent electro-chemists both in and out of the metallurgical industries, and the results of their work have become better known to public utility engineers. The evidence now gathered from Selkirk, Manitoba, is further proof, if any more proof be needed by engineers having even a little electro-chemical knowledge, that self-corrosion must hereafter be taken into account independently of stray-current electrolysis.

The time has now arrived when managers of electric railway properties about to employ experts for investigating electrolysis situations should insist upon the collaboration of competent electro-chemists with the electrical engineers and physicists, who have hitherto chiefly composed the body of experts from which such talent is usually drawn. Electrolysis experts will do well to recognize two things—first, that the electrolysis problem is fundamentally one involving electro-chemistry as well as physics, in order to evaluate the possibility of self-corrosion, instead of neglecting it, and secondly, that henceforth it will be possible, by means of testing equipment recently developed, to ascertain whether a pipe is really positive to the surrounding earth at the point of corrosion, before following the time-honored outdoor sport of chasing the deadly stray current to its lair.

Apart from all electrolysis controversies, the evidence mentioned will be of widespread value to the engineering profession in tending to dispel the traditional conviction that cast-iron pipe underground can be regarded as practically indestructible.

W. NELSON SMITH,
Consulting Electrical Engineer.

## *Auto Use Need Not Be Abused*

BOSTON ELEVATED RAILWAY

BOSTON, July 5, 1921.

To the Editors:

I note in your issue of June 25, page 1172, an article contributed by a manager of a Western property on the "Street Railway 'Auto Superintendent,'" and I cannot refrain from passing a few remarks on the subject.

If I remember rightly, when urban transportation was provided by horse cars, trackmasters, division superintendents, general superintendents and the like were provided with horses and buggies. If that was so, then the reference to having "the street railway superintendent frisk past the street car" as not being an example of good business applied in a relative way in those days when the superintendent drove past a horse car in a light buggy. While in this era of flying machines and motor vehicles there is danger of automobiles belonging to officials being misused, even in the days of horse cars a similar situation existed as complained of.

But the fact remains that the abuse of materials or facilities provided for officials or employees to perform their work more efficiently of necessity requires a checking up system and a knowledge of whether they are misused or not. In addition, there is another factor just as important, and that is the spirit of co-operation throughout the organization—of pulling together to make the property successful and efficient. In other words, the mental attitude of subordinates of the type mentioned, and if this *esprit de corps* is right the danger feared by the manager in the article is rather remote, or at least confined to isolated cases.

An automobile is a necessary tool under modern conditions to annihilate time and distance in the efficient conduct of a large urban property, and it is the duty of the management to see that it is used for the purpose for which it is intended.

EDWARD DANA,
General Manager.

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The trustees of Princeton University have planned to enlarge its School of Engineering, giving courses in civil engineering, electrical engineering, mechanical engineering, chemical engineering and mining engineering. These courses will extend over four years, at the end of which time the bachelor's degree will be given. A fifth year will be required for an engineering degree.

# C. E. R. A. Meets Aboard Ship

**Real Accomplishment Marks Meeting, Intermingled with a Delightful Cruise on the Great Lakes—Automatic Substations, Merchandising Transportation, Freight Claim Reductions and Separate Engineering Organization Discussed**

UNDER ideal weather conditions, the Central Electric Railway Association held its summer meeting aboard the S.S. *South American*, on a six-day cruise in Lakes Michigan, Huron and Erie. And despite the complete freedom from care and the abandon to pleasure and scenery and good fellowship, the three business sessions held were outstanding for the interest shown, the free discussion and the accomplishment. These meetings were devoted to papers and discussions on automatic substations, merchandising transportation, reduction of freight claims, organization of an engineering section of the association, and other committee reports. The total attendance on the cruise numbered 314, of whom 164 made the entire trip starting from Chicago, and 150 others boarded the ship at Toledo and Detroit. There seemed to be unanimous agreement that it was the best gathering the association had ever had and many began before it ended to plan for a similar outing next year.

THE "SOUTH AMERICAN," WITH THE C. E. R. A. ABOARD, IN THE "SOO" LOCKS

In the absence of President A. C. Blinn, who at the last minute was forced to stay home by unexpected developments in Akron, Samuel W. Greenland, first vice-president, presided at the various sessions. The first business session was held on June 29 and was devoted to the consideration of automatic substations. A paper by C. A. Butcher, followed by written discussion by Lawrence D. Bale and Charles H. Jones, appears in abstract elsewhere in this issue. In his absence Mr. Jones' paper was read by C. M. Davis, General Electric Company. Concluding Mr. Jones' written discussion, Mr. Davis went on to say that there was a fundamental difference in the method of control as followed by the two principal manufacturing companies. The one described by Mr. Butcher imitates hand operation while the other forces the machine to come up to speed with correct polarity through the use of a separate exciter. He said he agreed with Mr. Butcher that the single unit station is more desirable, though he could appreciate that there might be some instances in which a two-unit station would be advisable, though the use of any larger number than two was extremely questionable. He referred briefly to the possibility that it may be desirable to superimpose a remote control on the present complete automatic control for use in city service as a means of giving a centrally located load dispatcher control of individual feeders as well as whole stations. The possibility of a fire or serious accident giving rise to the necessity quickly to cut out a section of the trolley explains the need for such a scheme. He predicted that this remote control would become a feature of automatic substation power supply in city service.

Victor E. Thelin, Chicago Surface Lines, gave it as his personal opinion that the present automatic substation equipment is too elaborate, requiring so large an investment that it takes too long a time to realize a saving. He contended that further development must simplify the equipment and pare down the cost so that there will be greater appeal to the purchasers. He spoke briefly of an experimental installation of automatic reclosing circuit breakers in a substation otherwise manually operated and said that so far very good results had been obtained in cutting off the feeder altogether under overload conditions, rather than to have resistance inserted in the circuits at such a time. He believed that it was better to place dependence on the capacity of adjacent stations to carry the overload in case one feeder should trip out.

Mr. Davis explained that the use of limiting resistance in each feeder circuit in Des Moines virtually acted in this manner, for as the voltage is lowered at one station, the load is automatically shifted to other adjacent stations without killing altogether the feeder involved in an overload condition. This leaves adequate power on the line to keep the cars going while the trouble is being cleared.

Mr. Thelin then suggested that whenever resistance is put into circuits it means that power is lost. Mr. Butcher asked what difference it made whether the power were lost in resistance inserted in the circuits or in the resistance of the copper circuits where the load is shifted to another station. He urged the railway men to coöperate with the manufacturers in working out the problems involved in the application of automatic control, as this would hasten the simplification and lower the cost of the control system.

A special session of the association was called on the morning of June 29 for the purpose of disposing of various committee reports. The first to be heard was that of the committee on standards, of which H. H. Buckman, Scottsburg, Ind., is chairman.

### REPORT OF STANDARDIZATION AND BUREAU OF STANDARDS COMMITTEE

1. RAIL BONDS. — On account of the many types produced by the manufacturers which are protected by patents and on account of the differences of opinion of the consumers as to the efficiency of the various types and methods of application and the difference in capacity required even on any one property, your committee finds that it would be impracticable to recommend or use a standard rail bond.

2. TELEPHONES.—Owing to lack of information on this subject and absence of members of this committee conversant with the subject, your committee begs for further time to investigate and report.

3. ROLLING STOCK.—Your committee after considerable discussion agreed that standard city and interurban cars are desirable, but on account of varying local conditions on different properties, it finds that it would be impracticable to recommend any particular standards.

Referring to equipment for both city and interurban cars, your committee begs to call to your attention that equipment parts have already been standardized to a great extent.

4. CAR-STOP SIGNS.—Your committee begs to call to your attention that a report with samples of standard car-stop signs was presented at the meeting held in Toledo on May 26, 1910, at which time it was decided not to adopt a standard car-stop sign. However, your committee will be glad to again submit samples or designs of a standard car-stop sign if the committee is again instructed to do so and is informed how and where such a sign is to be installed.

NEW SUBJECTS. — Your committee recommends that the following subjects should be taken up and worked out and that they be given instructions to do so.

1. Revision of standard signal lines and trailer light connector is necessary. June 25-26, 1914.

2. Additions and changes to train signal system adopted June 26, 1914.

3. Controlling dimensions of passenger and freight cars used in interchange.

4. Standard length of air hose.

5. Assembly and details of air piping on draw bars.

6. Standard location of classification and tail light brackets.

7. Standard lamps and sockets for railway use.

8. Standard design of trolley retriever and catcher.

9. Controlling dimensions of rolled steel wheels, not including standard contour of flange and tread.

The report was signed by H. H. Buckman, P. V. C. See, J. W. Osborn, John Zoll and M. F. Skouden, committee.

### SEPARATE ENGINEERING ORGANIZATION PLANNED

The committee which has been studying the best plan of developing some form of organization by which the engineering personnel of the association would have an adequate medium for the interchange of common ideas and experience made its report. The report was read by Secretary Earlywine, the members of the committee being Myles B. Lambert, Westinghouse Electric & Manufacturing Company, chairman; P. V. C. See, Akron, Ohio; Harry Reid, Indianapolis, Ind.; Guy H. Kelsay, Elyria, Ohio, and J. W. Osborne, Lebanon, Ind., all of whom were present. As developed in the committee report and in the discussion which followed, the plan of organization is in substance as follows:

There is to be organized as a subsidiary of the Central Electric Railway Association an engineering council with four local engineering sections known as the Akron, Toledo, Dayton and Indianapolis Sections. Each section is to be headed by a director with six additional members to comprise the local executive board. The engineering council will consist of the director of each local section, two members of the executive committee, and a chairman who is to be the second vice-president of the association.

The local sections are intended to embrace all engineering branches of the industry. Each local section will arrange matters of discussion that will be of joint interest to the other sections or simply of local interest. Each section is to hold three meetings a year and at the annual meeting of the main association a half day is to be allotted to a general meeting of the engineering council, as a part of the regular program. At this time general engineering matters will be discussed, papers read, and any reports of the engineering council submitted for the approval of the association.

The plan of operation contemplates that at the beginning of the fiscal year the engineering council will prepare and submit to the local sections a program of subjects on which information, studies or reports are desired. It is to be the duty of the chairman of the engineering council to follow up the work assigned to these local sections, to insure execution of the assignment. All reports of an engineering nature are to be referred to the engineering council for approval before they are submitted to the main association. The same subject may be assigned to all four sections for study and individual report, the engineering council then acting to derive from these a final report for submission to the association. In addition to the assignment made, each local section is to be free to discuss other matters of interest or to initiate studies leading to recommendations to the engineering council and thence to the association. The standards committee of the association is continued for the present, but it is anticipated that the engineering council will function along this line and ultimately take the place of the standards committee. The president of the association, however, will be authorized to appoint an independent committee to study and report on any subject of a general engineering character, where this seems desirable.

The purpose expressed, of dividing the territory into four sections, was to keep to a minimum the amount of traveling and hence the amount of time off the property involved, and also to keep the size of the gathering small so that it could take on the nature of an informal round-table discussion. The reason for making these sections embrace all branches of engineering was that many of their problems are interrelated and furthermore, that the small informal groups would give an opportunity for frank discussion of interdepartmental differences and tend to eliminate the common jealousies which exist. It was also thought that the existence of four parallel sections might result in some healthy competition which would be fruitful of accomplishment.

As to the place of the manufacturers' representatives at these sectional meetings, Mr. Lambert explained that, all things considered, it had been deemed advisable that they should attend these sectional meetings only upon invitation. Whenever any particular subject is up for discussion, those manufacturers who are directly interested will be forewarned and invited to attend the meeting, prepared with data and information to take active part in the meeting.

The committee report was discussed favorably by the members of the committee and by R. J. Custer, Columbus, Ind.; F. H. Miller, Louisville, Ky.; H. A. Nicholl, Anderson, Ind.; S. D. Hutchins, Columbus, Ohio; C. L. Henry, Indianapolis, Ind., and F. D. Carpenter, Lima, Ohio. Mr. Henry expressed his belief that such an organization could be arranged without material change in the present constitution. He expressed the thought that the engineering council would probably either function as the standards committee or embrace the purview of the standards committee. He thought the plan was a good one except that it still embodied the old difficulty of getting men to do the work, and he emphasized the necessity to put behind the report the determination to put it through to success.

Mr. Carpenter said he thought the reason for much of the non-attendance at committee meetings was because the men were not properly backed up by their managements and urged to attend and give attention to their duty. He explained that no employee of the Western Ohio Railway is permitted to accept a committee assignment until this is approved by himself, but with this approval the man knows that he has the support of his superiors and therefore does his part. He recommended the same procedure to other companies.

Walter H. Evans, Tool Steel Gear Company, Chicago, urged the company to take good care of the subordinate equipment men and also emphasized the importance of not only getting the young college-trained men while the getting is good, but also to get good men without any particular technical training and bring them up in the shop. He lamented the passing of some of the outstanding equipment men, because there is no one coming along competent to fill their places.

After full discussion, the report of the committee was adopted and the president requested to appoint the engineering council as outlined in the report and direct it to work out the details for carrying out the organization planned by the committee and to report at the annual meeting in January. This resolution included the provision that the present standards committee should be continued and should work with the engineering council to be appointed, until the final details of the plan are worked out and such report accepted.

### REPORT OF FREIGHT CLAIM PREVENTION COMMITTEE

The freight claim prevention committee of the subsidiary traffic association, headed by S. A. Greenland, Fort Wayne, Ind., was then called upon for a report. The other members of the committee are C. O. Sullivan, W. S. Whitney, N. Rumney, F. D. Norviel and J. H. Pound. This committee was appointed to look into the possibility of reducing freight claims, having in mind the very good results obtained along this line by the American Railway Association and the American Railway Express Company. The committee reached the conclusion that this was more than a traffic proposition and required the co-operation of all departments, and for that reason submitted the proposition to the main association for approval. The committee recommended that each general manager hold a meeting of company officials to formulate plans for working out the following suggestions:

It is proposed that on each property

a committee be appointed consisting of the best informed men in the service, whose duty it will be to make careful study of things that can be done to improve the service, to advise and instruct fellow workmen, particularly new men; to distribute literature issued by the company or the association, and to see that employees are notified of meetings of committees and secure their attendance. For the first meeting of these committees on the various roads, each committeeman is to be requested to give in writing his opinion of the proper way to handle the particular line of work in which he is engaged and to offer suggestions that will improve the method now in effect. The best of these letters is to be selected by the chairman and sent to the secretary of the association, where, from all such letters received, the best will be selected and published for the benefit of all association lines.

It is also proposed that pamphlets be got out by the freight claim prevention committee with suggestions covering subjects and topics for the use of the local committees at their meetings in order to furnish topics of interest and secure similar work by all committees. It is also suggested that the question of loss and damage be not made the only feature of these meetings, but rather that the object of the movement be to improve service as well, which will automatically reduce the loss and damage.

BACK TO THE GOOD OLD HORSE DAYS

Proving that railway men are not particular about the form of motive power so long as it affords transportation. The driver, George Radcliffe, Cleveland, and these six other "indians" would not permit a shortage of autos to interfere with a tour of Sault Sainte Marie, when the ship stopped there for two hours.

The committee also requested the association to set aside an allowance of $250 to cover necessary expense of issuing circulars and pamphlets for use in conjunction with the work in hand.

While other members favored the adoption of the report and urged cooperation in carrying it out, H. A. Nicholl, general manager Union Traction Company of Indiana, Anderson, failed to see the need for it so far as his company was concerned and took exception to the idea of having instructions come into his organization from outside sources. He explained briefly the excellent results which had been obtained along the line of reducing freight claims through the work of committees already organized on his property.

C. S. Keever, Anderson, Ind., added that the seventy agents of the Union Traction Company had been called together in several meetings this year and instructed on the proper marking and handling of shipments, and the method of keeping record on the waybill of any irregularities. As a result of this campaign, he said that the company has had only ten claims this year of over $10. James P. Barnes, Louisville, also expressed the danger of any outside force endeavoring to secure a good *esprit de corps* in any organization which was unable to do this for itself. This opposition resulted in the report being referred back to the executive committee, where it was later adopted, however.

In discussing the report, S. W. Greenland emphasized the desirability of taking steps to reduce claim expenditures, by giving some figures developed by the secretary as the result of a questionnaire sent to all of the member companies. Of thirty-four companies who responded, it was found that in 1920 the total amount paid out in freight claims was $142,744. He said that by virtue of its "Right-Way Campaign" the American Express Company had decreased the claims in January this year as compared to the same month last year by 12 per cent, in February by 31 per cent, March, 38 per cent, and April, 69 per cent. For the first four months of this year a reduction in claims of 58 per cent as compared to the same period last year has been realized. Mr. Greenland gave these figures to indicate the possibilities in reducing this form of drain upon the companies' earnings.

The Thursday afternoon session was devoted to the subject of merchandising transportation. The meeting was started by the report of the committee on this subject, which is given elsewhere and was followed by some prepared discussions, abstracts of some of which are given following the committee report. This was followed by open discussion from the floor.

The general discussion which followed was led off by J. F. Ohmer of the Ohmer Fare Register Company, who said that all the points raised were mighty good, but who admonished the members of the association to "go home and do it." Myles Lambert of the Westinghouse company also raised the question, "Will you go back home and do it?" Mr. Lambert said that the best thing he had heard was a master mechanic (E. B. Gunn) tell how to sell rides.

C. L. Henry said that the fundamental fact is that if railways can't sell rides they can't stay in business. With reference to "going home and doing it," the thing that bothered him was how to do it. He recounted his experience in bringing his power plant up to date, and said that similar steps must be taken in an engineering way throughout each entire property, but he pointed out that it was easier to do it with physical things than with men. His advice was for everybody to work day in and day out, everywhere and all the time. Speaking particularly to interurban men, he expressed his belief to be as strong as ever in the full success of the interurban. As to the bus, it is here to stay, he said, and it must be used intelligently in this problem of merchandising transportation.

A. Swartz of Toledo said he thought the railway industry should let the public know its business. He advised against even thinking about lower fares at the present time, but it was brought out in later discussion that lower fare suggestions which have been made applied only to restricted areas, as a means of inducing short-haul traffic or of lowering city wide fares. Mr. Schwartz emphasized that the advertising work of the railways should be positive in its nature.

Mr. Lambert, speaking a second time, said that it is merely an economic law which dertermines the rate of fare and that it is the railways' duty to interpret this economic law and the resulting rate of fare, and this was what required sales ability. There are two conditions of fares which result in failure of railway companies: One of these is an unprofitable rate of fare, too low to pay expenses; the other is a rate which is beyond the reach of the average consumer, and this reduces the gross revenue. Some place between is an economic balance which, coupled with rigid economy of operation, means success.

The question of local securities sales was brought up and Harry Reid of the Interstate Public Service Company said that he started a year ago to sell preferred stock to friends and customers of the company and over $600,000 worth had been sold to more than 1,700 separate individuals. Mr. Henry pointed out the enviable position of the Lancaster (Pa.) Railway, where all stocks and bonds were owned in Lancaster County. In further discussion of the question of low fares and jitney competition, H. V. Bozell, editor ELECTRIC RAILWAY JOURNAL, quoted a leading public utilities commissioner who pointed out his very difficult problem in telling inhabitants of certain cities that they would have to pay 8 cents or 10 cents to ride from their homes to town, even though there were motor buses ready to carry them the same distance for 5 cents. While this commissioner said it would be necessary to do this in many cases, still it was a difficult problem for one in public life. Mr. Bozell called attention to a talk to trainmen given by P. S. Arkwright, president of the Georgia Railway & Power Company, Atlanta, Ga., (see ELECTRIC RAILWAY JOURNAL, April 23, 1921, page 771) as being one example of "how to do it" in training employees.

Mr. Barnes, in closing the discussion, commended the spirit of the association's discussion of the merchandising transportation question. He gave a brief reference to an experiment which he has just started in Louisville in the nature of a combined contest, safety campaign and closer co-operation between the trainmen and executives, the result of which is apparently most satisfactory. The experiment has been going on for such a short time, however, that he did not wish to draw any definite conclusions therefrom at this time. On motion the association continued the committee, requesting it to report again in January.

Abstracts of papers and discussions presented follow herewith.

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# Automatic Substation Progress

By C. A. BUTCHER

Westinghouse Electric & Manufacturing Company

REFERENCE to an automatic railway substation brings to the minds of some the small type used on interurban systems, and to others it means the large type of single or multiple-unit stations of larger capacity used for city service. Naturally the experiments in automatic substation operation were first carried out on a smaller and more isolated equipment. These experiments proved successful and applications were soon made to much larger machines. The largest at the present time are in the four stations on the property of the Cleveland (Ohio) Railway. Here three stations are now in operation, each consisting of two 1,500-kw., 60-cycle units in parallel operation. In all kinds of railway service there are at present approximately 100 automatically equipped substations in service. Approximately 200 equipments have been sold for the automatic operation of various types of substation equipment.

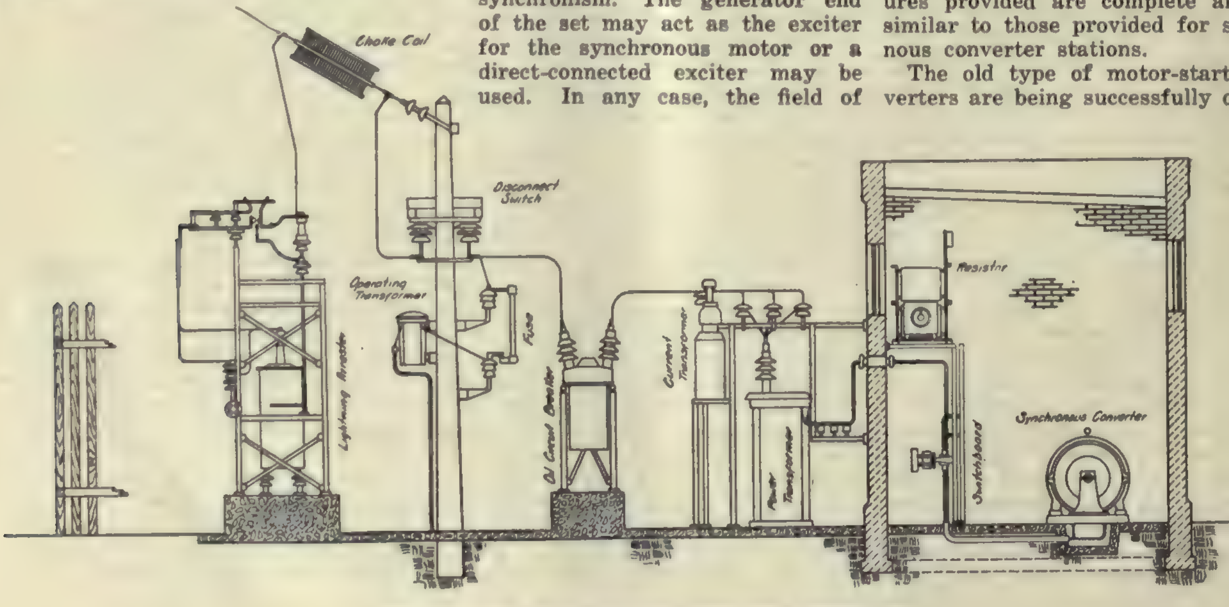
[EDITOR'S NOTE. — Mr. Butcher next explained the application of the automatic control principle, as developed by his company, with reference to the synchronous converter. This has been covered in some detail in articles in the issues of this paper for April 13, 1918, pages 705 and 707; May 17, 1919, page 948; the combined issue for Nov. 8 to Dec. 13, 1919, page 886; Jan. 31, 1920, page 259; March 27, 1920, page 654; Sept. 18, 1920, page 533. An extended further article will be published in an early issue. The balance of Mr. Butcher's paper was taken up with discussion of special applications of automatic control and concluded with the general summary of the present interesting problems in this field, substantially as below.]

## CONTROL OF MOTOR GENERATOR SETS

Motor-generator sets are controlled in a fashion very similar to the plan used with rotary converters with the exception, of course, that it is not necessary to correct polarity. The stations equipped with motor-generator sets start up upon the indication from a contact-making voltmeter connected between trolley and rail. Transition from a.c. starting to running voltage is effected by the operation of relays responsive to various indications of synchronism. The generator end of the set may act as the exciter for the synchronous motor or a direct-connected exciter may be used. In any case, the field of the exciter is usually directly connected to the generator end or the exciter end of the set. In applying reduced voltage to the winding of the synchronous motor for starting, alternating current of the frequency of slip is induced in the field winding. Since this field winding is directly connected to the exciter, the alternating current induced in this winding will flow through its armature. This alternating current opposes any tendency of the direct-current armature to build up its voltage. As stated, since this induced current is of the frequency of slip, it obviously falls to zero when the motor reaches synchronous speed. There then being no opposition to prevent the exciter from building up its voltage, it builds up in a perfectly normal way, and in doing so builds up a normal field current in the rotating field of the synchronous motor.

There are three distinct indications of synchronism: The first is the falling of the starting current to a minimum value. When starting voltage is applied there is at first a rush of current from the alternating-current line. This decreases in value as the motor increases in speed and reaches a minimum when the rotor has reached synchronous speed. An accelerating relay actuated from a current transformer may be used to indicate the attainment of synchronous speed. A second indication of synchronism is the attainment of normal machine voltage. A voltage relay can be so calibrated as to close its contacts at normal machine voltage. A third is the attainment of normal field current. A series relay in the shunt-field circuit of the motor can be adjusted to close its contacts under normal field current. Any one or a number of these relays in combination may be used to operate such relays as will effect the transition from the alternating current starting to the running position. The generator is connected to the bus in a manner very similar to that described for synchronous converters. The protective features provided are complete and very similar to those provided for synchronous converter stations.

The old type of motor-started converters are being successfully operated



ELEVATION OF SEMI-OUTDOOR AUTOMATIC SUBSTATION automatically. There are now in operation a half-dozen of these old-type machines and they are giving service equivalent to that of the modern type converter. The method of operation is:

The motor is first started. An accelerating relay in the motor circuit indicates approximate synchronous speed when the converter is connected directly to the full voltage taps of the power transformers through limiting reactors which pull the converter into step. The polarized motor relay is used to effect the transition as described for alternating current self-starting converters.

### SUBSTATIONS WITH TWO OR MORE UNITS

The control for stations equipped with two or more units is so designed that after load exceeding a given value has been maintained for a predetermined period of time on one machine another is started and automatically connected to the load. This feature is provided by means of a temperature relay which operates to close its contacts after the first machine has reached a given operating temperature. Under conditions of light load, the machines are cut out in the reverse order of starting. Switches are provided for making any machine the first to start. In case of failure of one machine to go into service, an auxiliary contact on the motor-operated timing relay closes to start the second machine after the lapse of 1½ minutes. The first is definitely locked out of service. A signal connected with the lockout relay may be used to indicate the failure. Until the lockout relay has been reset by hand, the second unit continues to function in the place of the first, the station starting up and shutting down on demand.

### A 1,200-VOLT STATION

One very interesting application of automatic switching has been made to a 1,200-volt direct-current substation on the line of the Fort Wayne & Decatur Traction Company at Fort Wayne, Indiana. This line has but one substation and the cars are run into the Fort Wayne Terminal on the city line at 600 volts direct current. The station is started by means of a series relay in the trolley circuit at the junction point of the two trolley systems. When the substation is idle, these trolleys are tied together through an electrically operated contactor.

For example, a car leaving the 600-volt section and crossing to the 1,200-volt section draws current through a series relay, the contacts of which are closed and the relays of the substation are thus energized over pilot wires to effect the starting of the substation. The 600-volt and 1,200-volt sections are tied together until the machine has come up to full voltage. At this point, the running contactors, in closing, effect the opening of the contactor which bridges the two trolley sections. This contactor is interlocked so that in its open position it effects the closing of the contactors of the substation, thus applying full 1,200 volts to the trolley section. The machine shuts down by the action of the timing relay in the manner described. It is thus seen that in case of failure of the substation to start, the cars can still operate from the 600-volt supply, though obviously at reduced speed. In case the substation shuts down, a car laying over at the end of the line can restart it by drawing current through the series relay from the 600-volt section.

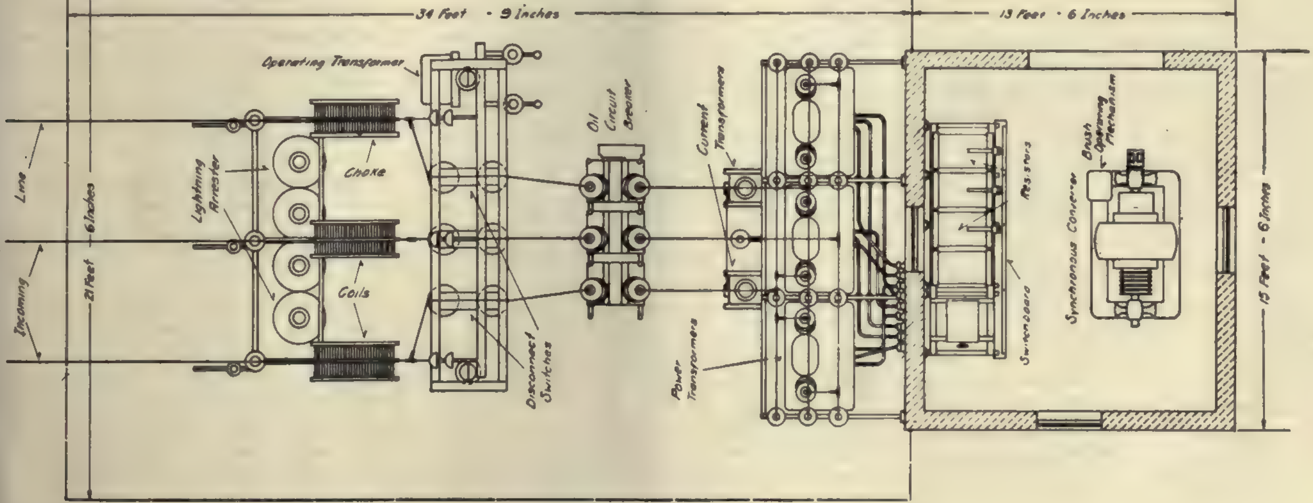
A novel feature of the 1,200-volt switching equipment controlling two machines in series is that but one control equipment is required for the station. The only duplication in equipment is the starting panel for the second machine. The starting contactor for the "high" machine is the first to close. Through the medium of an accelerating relay, after the first machine has reached synchronous speed, the starting contactor for the "low" machine is closed. The "low" machine acts permanently as an exciter for the "high" machine. Therefore, the scheme described for correcting the polarity of one machine automatically serves to establish correct polarity on the "high" machine, after the "low" machine has been corrected.

The transition from starting to running takes place simultaneously on both machines. The current limiting feature on the direct-current side is between the two machines rather than on the negative or positive side of the system. This is so that under no condition will greater than a 600-volt strain be imposed on the insulation of the devices used. A 1,200-volt contactor mounted on marble panel serves to disconnect the 1,200-volt side of the machine from the trolley circuit. These machines happen to have a rather poor starting characteristic and it is therefore necessary to use a relatively high starting voltage. For this reason the synchronizing torque on the starting voltage is very high, making it difficult to effect correction of polarity by field reversal. As in other cases where this trouble was encountered, the difficulty was overcome by paralleling the fields in the reverse position. Under parallel conditions never more than one field reversal is required to establish correct polarity.

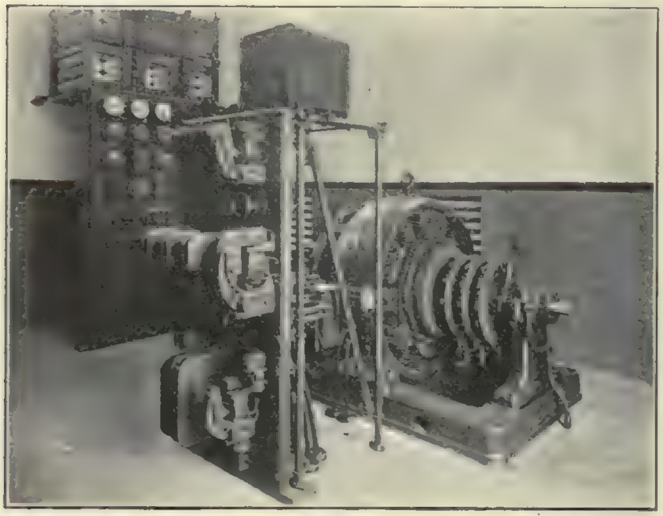
### DIRECT-CURRENT FEEDERS FOR CITY SERVICE

We have felt since the beginning, and have more or less definitely established the fact, that the current-limiting resistance type of feeder in city service is not very desirable because only in the event of short-circuit is it desired to open a feeder circuit. If, due to congestion of cars, the feeder section is overloaded, it is obviously desirable to hold that section at as near full voltage as possible to clear the congestion quickly. To insert resistance and further lower the voltage under these conditions only aggravates the congestion.

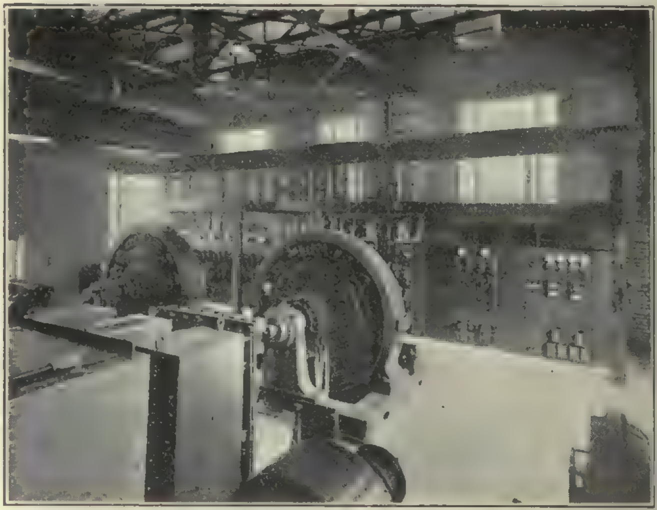
With this idea in mind there has been brought out a type of feeder equipment which eliminates this current limiting resistance. The feeder is so designed that it will not trip on a legitimate overload, but only in case of a short circuit. This is accomplished by means of a device which differentiates between a normal and an abrupt rise in load. The breaker, once opened



Plan View of Semi-Outdoor Automatic Substation



Rotary Converter and Automatic Control Apparatus in Substation of York (Pa.) Railways



View in Two-Unit Automatic Substation of Cleveland (Ohio) Railway

by this device, recloses only when the external resistance in the feeder circuit has risen to or above a normal predetermined value. In effect the device comprises a Wheatstone bridge arrangement which measures the external resistance of the circuit and operates a relay to effect the reclosing when the short circuit has cleared.

Inasmuch as the current-limiting resistance is retained in the machine circuit, the machine is protected from simultaneous overload on enough feeders from the station to cause overload on the machine. Retaining the current-limiting resistance in the machine circuit also makes possible rapid restoration of service on the system after a total "outage." In such a case, one machine starts up probably before a number of others and as it is the first machine in service on the system attempts to pull the total load. But for the limiting resistance, service would again be interrupted due to overload. By hanging onto the load through the current-limiting resistance for a short time, this machine permits others to come into operation very rapidly to bring about complete restoration of service.

The type of feeder described has proved very satisfactory. It will be applied to the three 1,500-kw. automatic substations now being built for the Cincinnati Traction Company. A device very similar to this is now being installed and will soon be in service on an automatic equipment designed to control a 1,000-kw. synchronous converter operating an Edison three-wire system in Milwaukee.

### SUBSTATIONS IN CITY SERVICE

The application of automatic substations to city properties presents a very interesting problem. City traction lines are usually made up of a series of extensions and additions. As the lines were extended, it was necessary to install feeders in order to maintain the required voltage. Then as the system grew and more cars were added it was necessary gradually to add to the power-plant capacity. As a result, a great number of street railway power and distribution systems are today frequently pointed out to the public as striking examples of inefficiency. In addition to heavy losses in positive and negative feeders, much trouble and litigation has resulted from electrolysis. In fact many cities have passed ordinances which limit the voltage drop in the rail. To overcome this condition it is necessary to install large amounts of additional negative feeders as well as extensive bonding between rails and subterranean structures.

Conditions in many cities have been bettered by converting power plants from direct current to alternating current generation with direct current supplied to the system from substations. In order to cut down operating expenses, the tendency has been to build substations of large capacity near the load center. This is, of course, a decided advantage over distribution from a power plant which, of necessity, is located near adequate water and coal supply and perhaps a mile or more from the true load center. However, the conditions of electrolysis are only slightly improved and great quantities of feeder copper are still required.

The progress of generation is certainly in the direction of large centralized power plants. This is in line with the conservation of our natural resources and a plan to link these large plants to trans-continental transmission lines. Such development naturally means greater efficiency of power generation and distribution with a natural result of cheaper power.

It should not be the business of a railway company to manufacture power. Its real business is to sell transportation. Each man in that organization should be in a position to concentrate his efforts on the real object at hand. Why should he be worried or burdened with the trials of a relatively small and inefficient power plant? Would it not be better to buy power from the central station, direct current to be supplied from substations so located over the system as to give the greatest advantage? If the railway operates the central station or vice versa, the conditions really remain the same.

Automatic substations eliminate the item of attendance and therefore make it possible to operate a great many stations with but little thought of that item. By dividing the system into small blocks, each to be supplied from a substation located at the load center of the block, we do away with the necessity of a great amount of feeder copper. In addition we mitigate electrolysis by reducing the voltage drop in the rail to a very small and harmless value. The scrap value of the reclaimed copper, in a great many cases, goes far toward financing the improvements.

The annual return is represented by the saving of copper and generation losses and power saving realized by virtue of the improved average trolley voltage. Improved trolley voltage makes possible a greater leeway in the schedule or permits a speeding up of the schedule, which in turn means greater returns from more frequent service. It may be possible to save platform labor by taking a car out of the number which are now required to maintain a given headway.

The labor situation on a great many properties has reached the point where the men have gone on strikes and tied the property up for weeks and months at a time. Automatic substations, by the elimination of the human element, and by virtue of a complete complement of protective devices, not only give a high order of service but give it with economy and satisfaction.

## Discussion on Automatic Substations

By Lawrence D. Bale

Engineer Substations Cleveland (Ohio) Railway

The first of the problems involved in the use of automatic substations in metropolitan service relates to the decision of the capacity and number of units to install per station. The solution of this question involves several problems in itself. The area or zone to be supplied by a station, which also fixes the capacity, is generally determined primarily by the investment necessary in feeder, and the annual charges, together with the losses occurring in the feeder layout. There are also several other considerations to be taken into account which often influence the problem radically. The most important among these are land values, building cost and restrictions, reserve equipment, alternating-current and direct-current feeders, and, above all, a system that will be conducive to a high degree of reliability of service.

With low land values, building cost and load densities which are encountered generally in small cities, sparsely settled areas or suburban districts of large cities there is no doubt a number of single-unit automatic substations will answer the requirements admirably. On the other hand, with relatively high current densities to contend with, and where the cost of land and building is high, the multiple-unit stations give the most economical layout, taking every item into consideration. This has proved to be the case in Cleveland.

On metropolitan systems, where continuity of service is one of the ruling factors, it is necessary to provide a large reserve capacity with the initial investments in equipment and distribution system. Where the multiple-unit station proves the most efficient and economical type to install, the factor of service insurance is further increased by reason of the scheme of automatic sequence operation which is included. The question of duplication of a.c. lines to a substation is also an important one from the standpoint of service insurance, for upon a system where disruption of service from "station outs" due to a.c. power line failures is at all prevalent high-class service cannot be maintained. Therefore, where the capacity of the station, in other words, its importance, will justify the expenditure for duplicate a.c. lines, which is the case with a two-unit installation of relatively large capacity, further insurance against service interruption is gained.

### CITY SYSTEMS ARE DIFFERENT

The operation of automatically controlled equipment upon city systems is, of necessity, quite different from that found upon the average interurban system. In city service the frequent starting and stopping common to the interurban substation is impossible, for with all stations upon the systems arranged to feed into the general network of feeders and with a very low resistance between stations each and every machine in service will tend to assume its proportion of the system's load. This tends to keep equipment in service when there is really no necessity for it, resulting in a lowering of the all-day station conversion efficiency. The two-unit station has an advantage in this connection in that the two units will operate to capacity during the morning and evening peak, while during the remainder of the day one unit will be shut down.

To overcome this feature of machines tending to remain in operation when not required, F. C. Chambers arranged the automatic substation of the Des Moines City Railway to operate at different voltage, ranging from 600 to 650 volts. The voltage adjustment which is based upon peak-load conditions enables the station with the lower voltages to shut down as the curve of the peak load descends, this arrangement, in conjunction with the manipulation of high-tension lines to the lower voltage station, apparently working satisfactorily.

To operate successfully a large city system consisting of a number of automatic substations, together with numerous heavy feeders, the general feeling is that some form of remote control superimposed upon that of the substation automatic control should be utilized. Through this system machines may be controlled, load transferred, and, in fact, all of the operations necessary in a substation on an important property performed. It is not intended to have the remote control take precedence over the automatic control in any case during normal operation, but during emergencies full control of the system may be attained by this means.

### REGARDING RESISTANCE IN FEEDER CIRCUITS

Referring to the section of Mr. Butcher's paper in which he discusses d.c. feeders for city service, this particular phase of the subject of automatizing the power supply of a large city system presents, as he intimates, one of the most troublesome problems of the whole question. Since an outgoing d.c. feeder may be subjected to a variety of troubles or conditions, it seems almost beyond reason to expect automatic equipment to function and be depended upon to handle properly each of the conditions that may arise. When a feeder is subjected to overload either from the extraordinary movement of cars or load from an adjacent plant that may be in trouble the feeder most certainly must not be disconnected from the station bus nor have the impressed potential lowered by the cutting in of resistance. When this feeder becomes grounded, generally by the breaking of a trolley wire, the proper handling of it will depend upon the policy of the operating company. On some systems it is customary to discontinue service on a grounded feeder until such time as the ground is removed, the time involved depending generally upon the efficiency of the line department trouble system, which may mean in some cases a considerable delay in the movement of cars. Upon other of the larger properties the policy is to burn off grounds, so that the movement of the cars may be subjected to the least delay. This measure is adopted on properties where a premium is placed upon continuity of service, as in Cleveland.

It is therefore seen that where a property wishes to maintain station bus potential on an overloaded feeder and also to burn off grounds neither of the two present methods of handling overloaded and faulty feeders automatically meets with both requirements, for the scheme of cutting resistance in on an overloaded feeder is not desired. On the other hand, this method may be utilized successfully in burning off grounds, while with the new method of feeder control mentioned by Mr. Butcher an overloaded feeder will not be opened nor its potential disturbed as far as the control is concerned, but a grounded feeder will open and remain so until such time as the ground is removed.

The presence of a number of outgoing tie feeders in an automatic substation under the present method of control constitutes a possible danger of disruption of service by causing the station bus potential to be lowered at a most inopportune time, or, worse still, by causing the rotaries to be disconnected from the bus entirely, by reason of the possible overload that may be transferred from one station to another through a number of feeders of low ohmic resistance, in the event of the failure of an adjacent plant under peak-load conditions.

Mr. Butcher states that in the event of the failure of a machine to connect with the load in one and a half minutes the machine is definitely locked out and remains so until the lockout relay has been reset by hand. In the Cleveland installation the sequence has been so arranged that, in the event of the failure of the machine to connect with the station load within the prescribed time, the first unit is locked out or shut down and the second machine is started in its place. However, when the second unit is connected to the station bus the first unit automatically unlocks and is then again made available for service upon demand. This feature is of particular value, for while it is true that if there is something radically wrong with the machine that failed, the unit will be locked out against further service. On the other hand, if the difficulty is of a minor nature, as, for example, a poor interlock contact, the possibility of the unit performing satisfactorily upon the occasion of the second starting is good.

Another very important feature is the starting of the second unit from the first upon the occasion of one machine being suddenly subjected to extremely heavy overload, causing the current-limiting resistance to be inserted in the machine circuit by the opening of the resistance shunting contactors. The second unit is normally started from the first by means of a thermal relay. This relay closes its contacts after the first machine has reached capacity load for a period of about fifteen minutes. To overcome the necessity of waiting for this relay to function under emergency or heavy overload conditions as mentioned above, the sequence scheme has been so arranged that when the resistance shunting contactor in the first rotary circuit opens, due to overload, the control circuit is established, starting the second unit after the lapse of one and a half minutes, thus promptly securing the assistance of the second unit in carrying the overload.

### CLEVELAND EXPERIENCE SATISFACTORY

While it is true that my observations cover but a relatively short period of time, the first station in Cleveland having been placed in full automatic operation upon Dec. 15, 1920, judging from observations up to the present, there is no reason why the power requirements of any system cannot be met satisfactorily and economically by utilization of automatically controlled equipment. It must be understood that there will necessarily be variations of control features upon every new system by reason of different operating conditions to be met, but with the engineering talent of those men now heading the automatic control divisions of the principal companies interested in this field, with the inclination of the engineer in charge of the property to co-operate, the limitations of automatic control in railway traction power supply are not in sight.

The stations of the Cleveland Railway are, I believe, the first case on record of the adaptation of the automatically controlled substations to a large city system. These installations also enjoy the distinction of being the first two-unit automatic stations of large capacities to be constructed. Therefore, the majority of the work in connection with the planning of the layout and the scheme of control has been of a pioneer nature. The results have been exceedingly gratifying, for aside from the d.c. feeder control scheme comparatively few changes have been found necessary. Some of these changes necessitated the redesign, addition or rearrangement of relays, but the majority were accomplished by changing circuit connections.

In the first installation it was found that by reason of a combination of conditions that could be set up by unusual occurrences in operation (either conditions not contemplated, or experienced but not corrected) it was possible to lock out a rotary, or, in extreme instances, both rotaries. As fast as these conditions were recognized provisions have been made or are under way to prevent their recurrence. When these changes are complete protection of these equipments will be had against every possible contingency and will give to the automatic stations, as planned in Cleveland, the maximum degree of continuity of service.

There have been several demonstrations on the Cleveland property illustrating the reliability of the automatic equipment as to its emergency stand-by features which I know will interest the operating engineer. In Cleveland, after 1:30 a.m., with but the early morning service in operation, together with shifting of cars in yards, etc., the load upon the system averages about 7,000 amp. It is customary to handle this load from 1:30 a.m. to 4 a.m. from a centrally located, manually operated substation, this plant being the only source of power for the entire system during that period. Upon three occasions the source of energy to the system has been interrupted by the opening of the a.c. power supply to this station, leaving the entire system without power. This occurrence immediately caused the voltage relay in the one substation (existing at that time) to operate, starting the first rotary and connecting it to the station bus, picking up the entire system load, this being accomplished in approximately thirty-eight seconds. This station, of course, inserted resistance in the machine circuits and held on to the load until the manually operated station was again in service, after which the automatic station ran for a period of fifteen minutes and then shut down. It is thus seen that the presence of automatic equipment upon the system will restore service almost immediately in the event of an outage.

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## Discussion on Automatic Substations

By Charles H. Jones

Electrical Engineer Chicago, North Shore & Milwaukee Railroad

The steps through which it is necessary to go in starting up a rotary converter and putting it on the direct-current bus are few and easily performed and the ways used to do this mechanically may vary in detail, but the methods used by the two manufacturers have proved to be satisfactory in service. In fact, better results are obtained by the mechanical method than by the manual method, due to the elimination of the uncertain human element over which we have very little control, especially in case of emergency operation, and substitution of a mechanical device which will function in a certain predetermined sequence of steps regardless of whether they are performed under normal or adverse conditions.

After the machine is put on the line and is handling the load we are face to face with a condition of machine protection which is a great deal different with automatic than with manual operation. In the manually operated station the procedure was to take the machine off the line in case of any trouble or severe overload and leave it to the judgment of the operator whether or not the machine should be put back on the line. This cannot be done in the automatic station, so that a new line of trouble-differentiating equipment had to be developed which would replace the judgment of man. From my experience it appears to me that in solving this problem there are possibilities of overdoing the protection and loading up of the automatic substation with a lot of devices which may in theory be a good thing but in actual practice will be detrimental. Looking back over many years of experience with hand-operated stations, I believe I am safe in saying that the failures of line and equipment have been comparatively few, and I think we can safely use this as a basis for anticipating trouble. My suggestion is that we should not try to protect against every conceivable failure, but that we should take care of the common ones and supplement this with some sort of remote indicator to inform a centrally located attendant, after locking out the station, of any unusual trouble. A remote indication is desirable where a few stations are automatic and essential on a large interconnected system. The cost would be comparatively small and the benefits large. The advantage would be great to have a recording ammeter for each station at a central location which could be watched by a load dispatcher. Such a system would offer a possibility of general car service supervision as well as power supervision.

The above suggestion is right in line with station inspection, which is of great importance and will require careful study. There is considerable difference of opinion among operators of automatic stations today about the proper frequency of inspection. Practice varies from daily to every two weeks. Personally, I think that frequent inspection will be the most economical in the long run. Where an inspector has good facilities for getting from one station to another he could easily care for from four to six stations on a daily inspection basis.

### SINGLE VS. MULTIPLE UNIT STATIONS

The question of multiple-unit stations has been raised in Mr. Butcher's paper. Experience has shown it to be practicable, but its desirability is another question. Among the savings to be made with automatic stations are reduction of operating labor and the elimination of d.c. line losses. Where a station has several machines and a large output per day, the cost of operation per kilowatt-hour becomes very small and may be less than the carrying charges on automatic equipment. The greater the number of machines in a station the larger the feeding area, with a corresponding increase in line loss over the loss which would accrue in the same area with more than one station. To be sure, increasing the number of stations by using a number of one-machine stations instead of a fewer number of multiple-machine stations will increase the initial cost due to land, building and transmission line cost, but there will also be a reduction in the distribution copper required. However, ample leeway will have to be provided in the distribution system to handle an adjacent station load in case of emergency.

Mention is made in the paper about the benefits to be derived in electrolysis mitigation by use of automatic stations. It seems to me that this is another very good argument for single-unit stations as the feeding area is considerably smaller. Since the advent of the automatic substation has completely revolutionized power distribution engineering, the question of single and multiple-unit stations cannot be answered in a general way, but the problem must be carefully studied at each location under consideration and a balance between all advantages and disadvantages arrived at.

### RESISTANCE IN THE FEEDER CIRCUITS

In the average railway substation the ratio between peak and average load during the heaviest hour is about 2 to 1, so that under normal conditions we have very heavy swings. The combined feeder capacity is generally considerably greater than the machine capacity. There is of course considerable diversity of load between the various feeders, though at times the swing on any one of the feeders may tax the machine. If there is no limiting resistance on the feeders, the swings in load may act to keep part of the machine resistance in circuit a considerable portion of the time, which will penalize all sections from the station. If some limiting resistance is used on the feeders, the penalizing takes place only on the section producing the overload condition. In the past, feeders have been provided with limiting resistance, equipped with a thermostat to open the feeder circuit on excessive heating. The capacity of the resistance was set at a rather low figure, so that an undesirable interruption to service might take place. With the application of an automatic reclosing breaker which would absolutely keep the feeder open on a short, I believe the capacity of the load-limiting resistance could be increased and the thermostatic control of the feeder opening set either very high or eliminated altogether. This would be a compromise between the two extremes of resistance and no resistance on feeders and I believe this would be a desirable condition.

## Report of Committee on Merchandising Transportation

FOR the successful merchandising of any product three major divisions may be recognized:

> First—Raw material: The raw materials of transportation are, of course, the general layout of the system, the provision of suitable rolling stock, track and power facilities, carhouse and shop equipment, etc., all of which is assumed to be complete and adequate.
>
> Second—Manufacture: Given the proper raw materials, the working up of a satisfactory commodity for sale must be carried out by an efficient, well organized and properly trained manufacturing force, which in the case of a railroad company rendering transportation service is composed of the operating and maintenance departments, whose production schedule is fundamentally the properly planned schedules for operating trains suitable for transportation conditions and maintaining equipments, roadway and other facilities, together with the necessary supervisory force to assure that these schedules are maintained and corrected from time to time to serve the changing needs of the community.
>
> Third—Sales: The sales organization of a transportation company should follow the same general lines as the sales organization of other successful corporations. General policies and methods of salesmanship must be determined and laid down by the head of the concern, general manager, or other appropriate officer. Department or division managers, or superintendents, will follow the general policies laid down by the head of the organization, applying them to the local conditions of their respective divisions or departments. The traffic supervisors would direct the transportation on the streets, and from the carhouses, and from the dispatcher's office. The motormen and conductors on the cars constitute the sales force in direct contact with our customers, the public, corresponding in the department store to the clerk at the counter, who actually handles the detailed transaction of sales.

The degree of public satisfaction and service rendered will depend almost entirely upon the manner in which the transaction of final sale is handled by the motorman and conductor on each car in the system. To a large extent, if not entirely, the attitude of the employee toward the public will reflect the attitude of the corporation officials toward the employee. Employees who are courteously and considerately treated will in general reflect this treatment in their attitude to the public. Courteous and considerate treatment on the part of a salesman in his dealing with a customer will produce that without which no railway or any other business organization can exist, namely, "good will."

No sales force can function properly without adequate instruction and training in detailed technic of its work. Motormen should be properly and rigorously instructed in the handling of equipment and made to realize that the most economical method of operation, including maximum coasting and smooth stopping by proper application of air, is also the most comfortable operation for passengers.

The training of conductors should be along the lines of courteous but firm application of the rules of the company, care with regard to the collection of fares, issuing of transfers, calling of streets and the value of the voice with a smile. The training of platform men, particularly those already in the service, should be in full recognition of the fact that men engaged in the transportation business, as in any other business, honestly and sincerely desire to know the best means by which to perform their work in the most satisfactory manner.

Your committee believes that it is good policy for the platform men of the railway companies to be sufficiently informed as to the affairs of their company to be able to discuss intelligently with their acquaintances and with strangers the position of the company, not only with regard to its finances but as to the necessity for its rules and regulations. Rules and regulations founded on good principles of operation are not weakened by explanation or discussion but are on the contrary made better and more lasting in their effect.

All cases of complaint and suggestion regarding rules and regulations or other matters of operation are worthy of careful consideration and whenever possible direct reply should be made to the person making the complaint or suggestion, indicating either its adoption or the reasons for not complying with the suggestion.

Men selected for traffic supervisors should receive special attention and instruction in matters of general operation and should be encouraged to correct mistakes detected in the operation by individuals, rather than by complaint to the superintendent's office.

To the end of improving the technic of the entire organization frequent meetings of supervisors or inspectors for instruction and discussion should be held. This particular means may well be extended to occasional meetings of the trainmen and in all such meetings the utmost freedom of discussion should prevail. In all such meetings, as well as in interdepartmental relations, a spirit of complete frankness must prevail if the best results are to be obtained. The day of secret meetings and confidential memoranda is past. No corporation, particularly no public service corporation, whose affairs are a matter of public interest and whose dealings should be an open book can successfully operate on any basis other than all cards on the table, face up, with employees and public. Where this policy is carried out in a public service organization the policies and ideals of the management will be reflected throughout the organization and the prime requisite of the successful manufacturer of transportation is summarized in two conclusions; first, a policy looking toward the rendering of the best possible service in all respects, and, second, complete frankness regarding all matters of policy and operation with employees and the public.

The report was signed by James P. Barnes, chairman; E. M. Walker and H. C. DeCamp.

## The Sales Work of Electric Railways

### BY HARRY L. BROWN

Western Editor ELECTRIC RAILWAY JOURNAL

At the last meeting of this association, held at Indianapolis, W. L. Goodwin gave an interesting talk about merchandising transportation and made the assertion that the street railway company is the only concern engaged in a large way in selling something to the public that does not have a sales manager. This is true, but the business is unique in another way. It is the only large enterprise in which the personnel employed in producing the commodity is also the sales force. This dual nature of the duties of trainmen is one of the circumstances that makes it difficult for a street railway company to meet its patrons with the proper sales spirit. The men have for years had impressed on them the necessity to get the cars over the road on time, to get the money and register it, etc., not to mention the sundry other duties. Undoubtedly those duties involved in the production side of the business are of first importance, for without a good product the best salesman on earth will have a hard row to hoe. Nevertheless, it may safely be said that much more attention may profitably be directed toward preparing the trainmen to carry out their duties as salesmen and constant representatives of the company.

What, then, are the strictly merchandising methods and sales activities that a street railway or interurban can employ to improve its business, assuming the service to have all the elements that go to make it good? The following list is suggestive and I shall discuss some of the points briefly; other points need no elaboration.

### A. ACTIVITIES TO CREATE TRAFFIC

1. Sell the ride for the lowest possible sum commensurate with proper earnings.
2. Advertise attractions and points of interest on or near the system.
3. Advertise the weaknesses of the competitor by pointing to the corresponding merits of electric railway service.

### B. ACTIVITIES TO ENGENDER GENERAL GOOD WILL

4. Keep telling the people of service improvements, in public addresses and through the newspapers.
5. Maintain an open-door policy and a friendly, willing, sincere attitude toward the public
6. Go the limit in the endeavor to comply with the wishes of the public authorities; in fact, anticipate their wishes if possible.
7. Adopt the man-to-man plan of talking things over with those who represent the public in dealing with the company, and avoid a belligerent attitude and maintain a conciliatory one.

### C. ACTIVITIES TO PLEASE CUSTOMERS ALREADY SECURED

8. Make good salesmen of the trainmen.
9. Keep the cars clean and bright.

1. The local transportation business is obviously destined to be one of the nature of the 5 and 10 cent stores—a tremendous volume of business at an exceedingly low unit profit. Selling the ride for a low fare is now assuming unusual and increasing importance because several things resulting from changing business conditions are conspiring to increase rapidly and to intensify the competition to be met by the electric railways. The first cost of automobile vehicles and the cost of gasoline, oil and tires have undergone substantial reductions, and the bottom has probably not yet been reached. Couple with this the fact that many men are out of work and that the second hand car market is flooded with good cars at an unusually low price, and it is not hard to understand the important increase in the number of these automotive competitors all over the country.

The problem must be attacked not only by encouraging just legal restrictions but mainly on the basis of attempting to meet that competition with competitive sales methods. A high rate of fare is an invitation to jitneys to start or remain in business. A low rate of fare acts as a deterrent to them to start and it also provides about the most effective means of offsetting their competition.

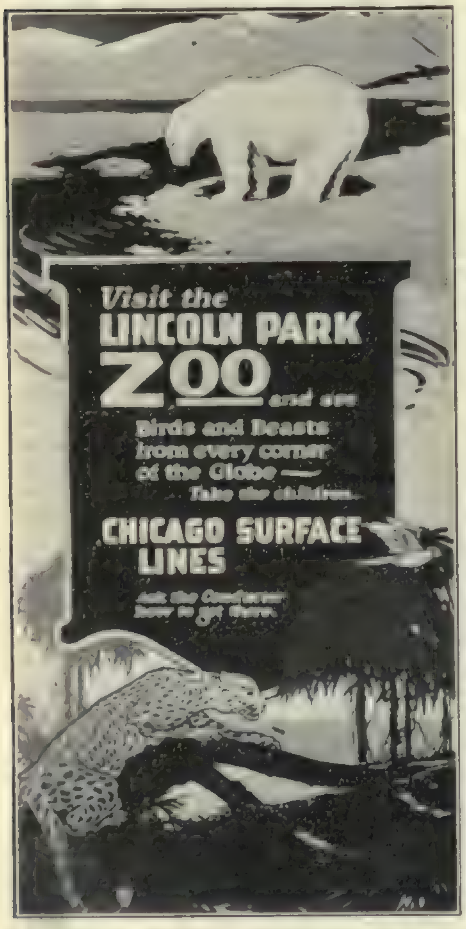
Aside from the competitive aspect, there is no need to dwell on the advantages of a low fare as a means of inducing greater riding, though it is to be expected that the resulting increase in number of riders will not always be sufficiently large to produce an increase in the gross revenue. There is another aspect of this short-ride consideration, however, which is worthy of attention. The jitney is usually a short-haul carrier, particularly if left to its own devices. Consequently, anything the street railway company can do to attract the short-haul riders to the street car strikes a telling blow. So it may be that where a system-wide reduction in fare cannot be justified, the establishment of a low rate for the central district will suffice to meet the competitive aspects of the business. Such experiments are now being made in Boston, Cleveland, etc.

But while the merchandising aspect of the low rate of fare is important, it is perhaps transcended in importance just now by the prospect of increasing competition. For this reason, if no other, it is my personal view that the electric railway companies will do well to take such steps as will make it possible to produce a ride for a smaller fare than the average now in force. In other words, the cost of operation should be brought down so that the fares may logically be reduced. Some of this reduced cost can be secured through a reasonable reduction in the rate of wages, keeping in mind that electric railway trainmen should be considered, in the future if not in the past, as skilled labor. More reduction can be secured by checking up on the practices of every department with a view to eliminating any waste and producing better efficiency all along the line. If the desired results are not obtainable through this process and by virture of lowering costs of materials and supplies, then (and perhaps anyway) the industry must face the necessity to make some radical departures from present operating practices—perhaps a great expansion of one-man operation both on safety cars and on present double-track cars, or something else having an equally important effect on the operating ratio, and making possible lower fares.

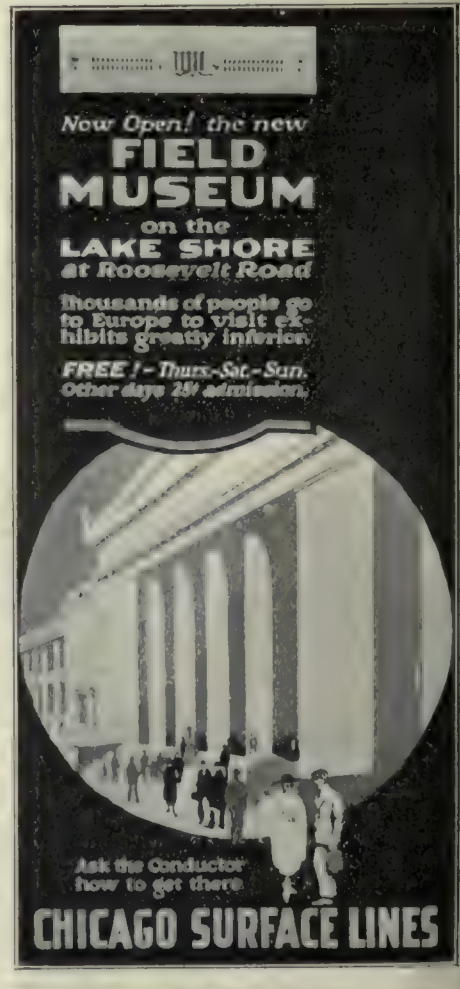
The company that has no jitneys now can thank its lucky stars, but it will make the most of that advantage if it recognizes the potential danger and meets that competition before it begins—meets it with low fares and in other ways.

2. This means of creating traffic by advertising attractions and points of interest is well illustrated by the accompanying samples of the work that is being done along this line this season by the Chicago Surface Lines. This form of merchandising rides is quite generally used and its value is seemingly well recognized, but more can be done.

3. As to how to advertise, the street car or interurban has many advantages not possessed by the automotive vehicle—at least to date—upon which the railways could base good advertising copy designed to set people thinking. For example, let the street railway advertise its organized responsibility, the financial protection it affords in case of accident, the reliability of the service, the comfort of the ride, absence of the indecency of crowded jitneys, the courtesy and trustworthiness of employees and the protection they afford passengers, absence of wild and reckless drivers, frequent inspection of the equipment to insure safe operation, etc. This kind of advertising can very well be carried on in the newspapers as well as in the cars. It should not point out directly the weaknesses of the competitor, but by pointing out significantly the advantages of the electric railway,



ARTISTIC COLORED POSTERS ARE NOW USED IN CHICAGO



THE ZOO AND THE FIELD MUSEUM MAKE GOOD ADVERTISING COPY the inference will be obvious and the point will strike home without offense. Then, too, it should be remembered that in this business, as in any other, it is the persistent advertiser, the one who keeps plugging away and telling his story over and over in as many ways as he can, who derives the real value of his advertising expense.

8. Making good salesmen of the trainmen is the particular phase of the problem of merchandising transportation that is dealt with in the very able report of the committee headed by Mr. Barnes, and which forms a sequence of his particularly valuable paper presented before this association at its last meeting. I will take time for just a suggestion or two along this line, to supplement what is contained in this committee report.

Would it not be well to do more along the line of injecting the spirit of contest into the training? Give a worthwhile prize to the trainmen who gives the best account of himself along these lines. Something along the line of the politeness campaign conducted on a daily prize basis by the Chicago *Tribune* for the general public over a period of several weeks and attracting a great deal of attention and newspaper comments from remote cities is what I have in mind. This would put the trainmen "on their toes" on this phase of their work, and it would also create a good deal of public interest and favorable newspaper comment.

This would also put new interest in the work for a time, and, as a means of overcoming the humdrum and affording a variation from the "continual lecturing" which the trainmen on many properties undergo, is a good thing. Too often, the line of talk given to trainmen holds up some inducement for better work, some half-promise, the fulfillment of which is so remote as to offer no inspiration for renewed vigor, if indeed it does not actually react to discount the sincerity of the speaker. An example of this is the suggestion often made that if the expenditures involved in accidents were reduced through more careful operation, this money would be available for increased wages. This may be said in sincerity, but with the average company there are so many places, ahead of increasing the payroll, for any possible spare money, that the likelihood of any increase in wages because of a lowering of the accident account is very remote.

### IS THERE NEED FOR A SALES MANAGER?

From the above incomplete outline of the strictly sales work that may be profitably undertaken by the average electric railway company, does it not seem that there might really be a place in the organization for a sales manager, as suggested by Mr. Goodwin? Here are presented quite an array of activities that are only incidentally part of the duties of any of the present department heads, and which at best are handled as more or less of a side issue by the general manager, whose time is so thoroughly occupied with matters more pressing than these merchandising considerations. The average street railway company does not have any one whose primary duty it is to concentrate a good deal of effort on the upbuilding of the company's good will and the expansion of its business. I am inclined to believe that a sales manager with the proper personality and viewpoint, and having specifically in charge the sales work of the company along the lines indicated herein, would make a very valuable addition to most street railway organizations, his duties even including the conduct of a sales school through which the student trainmen would pass after completing their training under the operating department.

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## Competition and Co-operation

By W. S. Rodgers
General Traffic Manager Detroit
United Railway

Merchandising of traffic by electric lines is a feature of our business which calls for stronger efforts at present than we have put forth during the past few years, as the picking is thinner and the competition more keen. We are confronted with changing methods of transportation which must be reckoned with, such as jitneys in the cities, buses in the country and trucks handling the short-haul freight. Added to these new forms of competition, we find the steam roads now fighting for the short-haul traffic which they scorned during wartimes.

In order to curb the wildcat motor truck and bus competition, we must continue to exert our efforts toward securing the enactment of regulatory laws to stabilize the various forms of automobile lines of transportation. This can be accomplished by proper publicity methods showing the injustice of cities permitting jitneys to run on the streets over which car lines are operated and competing with established lines of transportation by operating at their pleasure, charging what they will and not contributing in the same proportion as the car lines to the upkeep of the streets and in taxes.

The same method should be followed in dealing with the auto bus and truck competition on the country highways. We must show the state and county officials as well as those who are paying the expense of building and maintaining the highways the damage that is being done to them by the constant use of the roads by heavy vehicles which are deriving a valuable revenue from the handling of freight and passengers without paying their just proportion of the cost of furnishing the right of way needed for their operation. We must, however, recognize this class of competition and it must be met by supplying the class of service that will defeat it or keep it at a minimum.

Our equipment is more comfortable than the average jitney or bus and, if we can furnish frequent service and seats to passengers, I believe the loss of traffic to that class of competition will be greatly lessened. I am of the opinion that the ultimate end of the truck competition for distances over twenty or thirty miles will be by co-operation between the trucks and the electric lines to the extent of the former performing the pick-up and delivery service in the terminals and the latter handling the freight over the road, as it is obvious that the railway can perform the service of hauling much cheaper than the trucks and the most economical method of transportation is bound to prevail in the end.

Our lines started negotiations a year ago with representatives of the truck companies formerly operating between Toledo and Detroit with the idea of working out such an arrangement, but the proposition was dropped when the industrial depression began because the trucks were forced to cease all operations on account of the absence of business.

The question arises as to whether or not we are using all the means at our command for the purpose of advertising our wares. We sell the advertising space inside our cars and use very little of it ourselves. The front end space which is open to the whole community through which the cars travel goes unused to a very large extent. These are valuable mediums for setting forth our advantages and should be kept busy at all times in telling the public the attractive features of the service we are furnishing in a plain and interesting manner.

Through car service over connecting lines giving long distance service without the transfer of cars for both passengers and freight is one of the surest and easiest ways of attracting business, especially the long-haul traffic, to electric lines and this is the class of traffic we must especially cater to, if the automobiles are to continue making inroads into the short-haul business.

Another class of traffic to cultivate is that which can be handled in conjunction with the steam roads. The old time hostile attitude displayed by these lines toward the electric line industry shows signs of disappearing and we should do everything in our power to cultivate through arrangements with the steam roads and the joint handling of both classes of traffic.

To succeed in selling our wares we must give the best service that is possible to furnish, as service is the foundation on which all of our efforts to sell are based and is what counts for the most in the long run. Service in its full sense includes suitable accommodations in the form of stations, equipment, proper schedules and courteous employees. Too much emphasis cannot be placed on the necessity of educating the platform men, who are our final salesmen, as well as every one else from the president to the office boy and laborer, of the reward of the virtue of a pleasant smile and civil treatment to all with whom they come in contact.

We must instill in the minds of all that every one connected in any capacity with the operation of the railroad is selling transportation directly or indirectly.

We should be keen to study the requirements of our patrons and endeavor to the best of our ability to supply the kind of service they require even though it means the rearrangement of schedules and working conditions. We should also study the business policies of our competitors with a view of meeting them and not allowing them to eclipse us by more advanced methods or by supplying the public in a manner that we ourselves should do. It is very helpful in ascertaining what our competition is, to create a habit among all of our force of reporting to the proper officer any new service of our competitors which they find commencing operations and any suggestions of a general character for the improvement of the service which may occur to them. Too often such communications are received and filed away without even being acknowledged. This is the wrong course if we are to encourage co-operation from the force. Every idea presented should be considered and adopted or declined on its merits and an explanation given to the one offering the idea if it is deemed inadvisable to adopt it.

## The Satisfied Employee

By Guy H. Kelsay

Superintendent of Power and Shops, Cleveland, Southwestern & Columbus Railway, Elyria, Ohio

Would you select the agency for an article if you knew that the organization of selling and manufacturing forces was poorly managed and backed by a loose, irresponsible corporation; if the departments in the company were selfish and jealous; where the spirit of the individual worker has been crushed to such an extent that he has no interest or pride in the finished article? Of course you would not, because it is not possible for a firm to put out a good article under such circumstances.

The key to a fulfillment of the ideas of Mr. Barnes and the committee is certainly supplied by an interested and satisfied employee. A man cannot work as a machine and have the spirit that is necessary to be a part of a successful organization. Your committee has very plainly stated that the time of "secret dealings" is over, and we must take each other into our confidence, and the employees to the last man should know and be interested in the multitude of affairs of the company other than the exact line along which he is spending most of his time so he may consistently be an enthusiastic supporter and advocate of the spirit of good will between his company and the public.

We should not fail to realize that an opinion freely expressed by an employee among his neighbors will carry more weight than weeks of pleading from the officers of the company through the channels that they must use to reach the patron. A very definite illustration recently came to my attention. A workman complained and criticised the company because he was not furnished material and help to renew and repair the particular part of equipment in which he was interested. In response to an explanation to this employee that the company earnings were not sufficient to meet all its needs, a very prompt reply was received, "Why I saw in the paper where the company's earnings last year were ——— hundred thousand dollars over the previous year." It was true that the report of the board of directors did appear in the daily paper giving the increase of gross earnings but failed to convey with equal force the much greater increase of operating expenses.

It is certainly our duty to censor the articles that go to the public and equally important that the employee gets a true impression of the facts. All our troubles are caused by a lack of knowing the facts, and if we "think out loud" or "lay the cards face up" every one will know that we do business that way and the matter of confidence and straight dealing in our own organization and with the public will be an established fact and patrons will soon be receiving bits of plain facts from our interested and satisfied employees. It takes a very big individual not to be selfish, egotistical or jealous to some little degree. The committee calls to our attention the importance of frankness in meetings and inter-departmental conferences. All parties to such gatherings must certainly be free to listen and exchange ideas without a trace of selfish or jealous rivalry.

Meetings with employees have often been conducted by individuals who were not qualified to obtain and maintain a free and interested discussion from workmen of all ranks, and these result in a frozen spirit. Suggestions from an employee may be ridiculed or ignored and this develops in him a dislike for such meetings.

We will sell our transportation just in proportion as we sell the idea to our employees who are our salesmen. We have all some time in our experience had to deal with a co-worker who liked, or thought it his duty, to call to the attention of the superintendent or manager the other fellow's shortcomings or small department matters rather than to be big enough to take the matter up direct in the right manner with the department. As long as individuals with this sort of spirit are in an organization the highest success is not realized. It is natural for one to like to do what is right but not so natural to want to do it because he is "jacked up by the boss."

Much has been said and written during the past five or six years to justify the terrific costs of transportation, and much has been talked and written during the past year to soothe our own feelings and the financial interests back of our properties, that we are nearing the "promised land" of lower operating costs and that we are to receive just recognition of the importance and necessity of adequate fares from the public and sanction from commissions. One of the "lower operating costs" is labor, but the reduction of wages to the average employee cannot be other than disappointing, even though the increased wage that has been paid was justified in the main by the increased cost of necessities which are now coming down in price. But many employees in all classes of service have meanwhile unconsciously changed their standard of living, which makes it only the harder to see the justice of wage reduction, so it will be incumbent upon the managements to be most untiring in their efforts to handle this delicate subject in order to maintain the maximum of loyalty and wholehearted support from the employees.

There must be a freer exchange of ideas between men who know and there must be a freer acceptance of ideas by men who do not know. The managements of properties must delegate their engineering matters to men who know engineering, their traffic matters to men who are students of traffic, and their equipment maintenance to men professional in their line, and all must work together with a corps of boosting and loyal workers, loyal because they believe in the policies of the company they are working for. Then we will sell our transportation.

## Merchandising Transportation

By Bert Weedon

Traffic Manager Indianapolis & Louisville Traction Railway Company, Indianapolis, Ind.

The great transportation systems in our large cities, serving millions of people daily, are indeed important factors in the growth and welfare of the cities served. Cities may be likened to human beings, in that the transportation system of a city is as important to the life of that city as the arteries are to life in a human body.

Cities, as a whole, apparently do not realize or consider the importance of their transportation systems. Unfair treatment by city government of the city's transportation facilities not only affect adversely the transportation facilities, but also affect adversely the citizens of that city. The report of the committee deals with this subject on the basis of "merchandising any other commodity."

In a general way this is true, but let us look into the subject from this viewpoint. Is there a manufacturing concern in Chicago, St. Louis, Cincinnati, Cleveland, Louisville or Indianapolis that carries the heavy investment for producing its product as do the transportation companies of these cities? How often does the manufacturer turn his capital? How often does the transportation company turn its capital? In the average manufacturer's business, and the average transportation company's business, what is the difference in the relative ratio of net profit? But let us not enlarge on existing conditions more than to bring ourselves to realize the importance of the work in hand.

Selling our product, whether it be city street car transportation or interurban transportation, is perhaps one of the most, if not the most, important part of our work.

The training of employees in this work is surely very essential to the success of any property. From the pick and shovel to the president's office requires more gray matter than we realize. The committee reports that co-operation and co-ordination of all departments is important. This is absolutely necessary. General policies and sales methods should be determined by the executive in charge of this work. Extreme care and rare judgment should be exercised in determining these policies. To educate men to carry out these general policies costs vast sums of money each year.

It has been very truly said that the transportation company is largely judged by its platform men. The conductor and motorman are the salesmen who meet the public face to face. Do we realize the importance of personal contact with these men? Do we know their trials and difficulties? Are we giving these men the support they should have in order that they may deliver to us the success we demand?

Every man connected with a transportation company is a public servant; and when new men are placed on our pay rolls, they should be educated carefully in their duties, to the end that they may deliver to the public the service they demand.

The question is asked, How shall this be done? There are many theories offered, and many are worthy of consideration. The report of the committee covers this subject conclusively.

The matter of publicity is also an important factor. The transportation systems of the entire country are suffering from a lack of honest, straightforward publicity. Tell the public the truth. Does the public know the efforts that are being made to create and maintain the service they demand? Does the public know the cost of such service? Does the public realize that, because of adverse legislation, both by states and cities, the average investor refuses to buy public utility securities? Does the public know that petty politicians use the transportation facilities of their cities and states as food to stir up hatred and animosity? Do we realize that we have all of these problems to meet, and if so, how are we meeting them? Publicity and lots of it is necessary. Let the people know our troubles. Impress upon them the importance of their transportation system and of their duty to this system. How long can any great city exist without transportation?

Let us look well into our organization. Is it a real organization? Does the head of every department have his duties clearly outlined? Are the departments co-operating properly? Are the employees in each department being properly trained and educated to carry out their portion of the programs? Are we making future heads of departments in our own organizations? Are we endeavoring to fit our whole organization to meet the public squarely and fairly in the discussion of policies and rules which affect the public?

Further discussion on the Merchandising Transportation report will appear in an early issue.

# Sale of Securities by Utilities*

By H. E. Weeks

General Manager Securities Department, United Light & Railways Company, Davenport, Iowa

IN THE beginning the financing of public utilities was cared for by public-spirited citizens. Gradually control passed into the hands of bankers, located in the financial centers, or clients whom the bankers were able to interest. As long as the utilities were controlled locally the personal contact of the owners with the customers did much to prevent misunderstanding.

When customer ownership of securities marketed by the utilities was first advocated it met with considerable opposition from the investment bankers, who rightly felt that the utilities owed them something for carrying them through the development period. The opposite is now true.

The high cost of money has done much to promote customer ownership of securities. High rates for money are more important to utilities than to enterprises where money is turned more frequently. Their financing is made difficult also by the tax exemption feature of government and municipal securities. The *Wall Street Journal* recently estimated that there are $14,000,000,000 of tax-exempt securities in the country, exempting $700,000,000 of income from our greatest direct tax.

The United Light & Railways Company operates seventeen companies serving 600,000 people in over fifty cities and towns. Some time ago the company decided to offer its securities to employees and the public and the board of directors offered for sale $2,000,000 of 7 per cent preferred stock at par. The stock was offered to the employees either for cash or on the installment plan. An employee was allowed 25 cents per share for each year he had been in the company's employ. If he was ill from six days to six months during the nineteen-months period of making payments his payments were made by the company and if he died a fully paid certificate was issued to a designated person.

The stock was offered to the public through employees only at par for cash or on the installment plan.

The employees of each of the large companies were organized into teams of ten each to compete in the sale of the stock to the public, and the cities were divided into districts to be assigned to the teams. After the team organizations had been maintained for about three months a separate securities department of the company was organized. The manager of each operating company was made responsible to the manager of the securities department for the sale of securities by his company. The department selected from the employees who had made the best record a corps of salesmen who were put permanently on the department payroll. The team organization was abandoned, but the company continued to pay a bonus of $2 per share sold.

Our experience shows that the average original sale is three shares. A map on which a tack indicates each sale demonstrates that where one sale is made others follow in the same vicinity.

The better knowledge of the affairs of the company secured by the employee who becomes a stockholder and salesman and the customer who becomes a stockholder is a great asset to the company. It is necessary, however, that a company protect the investment of investors in its securities, otherwise ill will is bound to result.

## Another Utility Information Bureau Formed

ON JUNE 15 the Georgia State Utility Information Bureau was formed in the interests of the companies in that State. L. K. Starr, formerly assistant city editor of the Atlanta (Ga.) *Journal*, was elected as the director. George T. Smith, Augusta-Aiken Railway & Electric Company, is chairman of the bureau.

On June 17 Labert St. Clair, director of the American Association's advertising section, met informally with the bureau and others interested in the railways in the southeast for a conference. The purpose of this conference was to show how the advertising section could materially aid these companies in their campaigns. It also gave Mr. St. Clair first-hand information as to some of the problems confronting the traction industry in this part of the country. W. P. Strandborg, publicity department, Portland (Ore.) Railway, Light & Power Company, and an officer of the Associated Advertising Clubs of the World, also attended the meeting. He spoke of the desirability of having a utility section in the Associated Advertising Clubs.

Among those who attended the conference, which was held at the offices of the Georgia Railway, Light & Power Company, were L. LeMay, Memphis (Tenn.) Street Railway; P. S. Arkwright, Georgia Railway & Power Company; W. J. Baldwin, New Orleans (La.) Railway & Light Company; C. R. Winston, Virginia Railway & Power Company; George T. Smith, Augusta (Ga.) Aiken Railway & Electric Company, and E. C. Stothart, Charleston (S. C.) Consolidated Railway, Gas & Electric Company.

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*Abstract of a paper read before joint meeting of the Iowa Electric Railway Association and Iowa Section, N.E.L.A., Spirit Lake, Iowa, June 23, 1921.

## First Convention of the New International Association

THE first convention of the new Internationale Strassenbahn und Kleinbahn Verein took place in Vienna May 29 to June 3. It will be remembered that this association, comprising the companies and individuals of several Central European countries, was formed six months ago for the purpose of an exchange of experiences. The new association in no way intends to be in opposition to the Union Internationale, and a connection between the two is maintained by a number of members, like those in Holland, Norway, Sweden and Denmark, which are also members of the Union Internationale. The meeting in Vienna was attended by delegates from the countries as well as from Rumania and Jugoslavia. At the conclusion of the meeting these officers were elected:

President, Ludwig Spängler, manager of the Vienna Municipal Tramways; vice-president, Dr. Frederick Wussow, president of the Association of German Tramways and Interurban and Privately Owned Railways; secretary, Dr. Arthur Ertel, Vienna; executive committee: For Germany, Max Dräger, Berlin; Mr. Löwit, Manheim; Otto Hubrich, Essen; for Denmark, Kai Norregaard, Copenhagen; for Holland, Mr. Van Putten, Amsterdam; for Norway, Jörgen F. S. Barth, Christiania; for Sweden, Einar Hultman, Malmö; for Switzerland, Hermann Geiser, Schaffhausen; for Hungary, Wilhelm van Ghatel and Mr. Von Sztrokay, Budapest; for Czecho-Slovakia, Oscar Hausmann, Gablonz.

## Standards Secretaries Meet

A CONFERENCE was recently held in London of secretaries of the national standardizing bodies. The conference had for its object the interchange of experience and the furtherance of co-operation among the several national bodies in their work of industrial and engineering standardization. Arrangements were perfected for closer co-operation between the national standardizing bodies and the International Chamber of Commerce, which was to give special consideration to standardization at its convention scheduled to be held in London during the week of June 27. Belgium, Canada, Great Britain, Norway, Switzerland and the United States were represented at the conference.

## Association Meeting

### Pacific Claim Agents' Association

At the last annual meeting of the Pacific Claim Agents' Association it was decided that the twelfth annual convention of the association be held at Butte, Mont., on Aug. 18, 19 and 20, 1921, provided these dates were satisfactory to the membership. At the executive committee meeting the following subjects were assigned:

"New and Recent Improvements in Car Construction Designed with the Object of Eliminating Accidents," H. C. Winsor, superintendent of investigations and adjustments, Tacoma Railway and Power Company, Tacoma, Wash

"The Importance of Claims Department Statistics and What Statistics Are of Most Value," J. H. Handlon, claim agent, U. R. R. of San Francisco, San Francisco, Cal.

"The Value of Moving Pictures as a Means of Exposing Malingerers and Fraudulent Claimants," C. M. McRoberts, general claim agent, Los Angeles Railway Corporation, Los Angeles, Cal.

"The Modern Trend of Workmen's Compensation Laws and the Effect that Such Laws Have upon Employees Who Have Minor Accidents," P. O. Solon, claims attorney, San Francisco-Oakland Terminal Railways, Oakland, Cal.

"Publicity in Connection with Accidents, Claims and Litigated Cases," W. H. Moore, claim agent, San Diego Electric Railway, San Diego, Cal.

"The One-Man Car and its Effects on the Traffic Hazard," Thomas G. Ashton, claim agent, Washington Water Power Company, Spokane, Wash.

"Co-operation with the Public in Accident Prevention Work," B. F. Boynton, claim agent, Portland Railway, Light & Power Company, Portland, Ore.

"The Doctrines in Law of Contributory Negligence and Last Chance Doctrine as now Applied to Accident Cases," Fred F. Furman, attorney, Butte Electric Railway, Butte, Mont.

"The Genteel Fakir," F. J. Lonergan, attorney, Portland Railway, Light & Power Company, Portland, Ore.

"Methods of Collecting from Owners of Foreign Vehicles Who Have Injured Company Employees While They Were at Work. Policies Pursued by Member Companies in Handling Claims of Employees Injured While Not at Work," S. A. Bishop, general claim agent, Pacific Electric Railway, Los Angeles, Cal.

"Methods of Following up Claimants and Witnesses to Accidents," J. W. Grace, claim agent, Sacramento Northern Railway, Sacramento, Cal.

"How Can the Personnel Department of a Company When Hiring and Training Employees Assist in the Prevention of Accidents," J. S. Mills, superintendent of personnel, San Francisco-Oakland Terminal Railways, Oakland, Cal.

"Suggested Legislation Governing Grade Crossing Accidents and Other Methods of Preventing Such Accidents," A. M. Lee, claim agent, Northern Pacific Railway, Seattle, Wash.

# American Association News

## Safety Campaign Suggestions

THE American Association's advertising section of information and service has just issued an illustrated twenty-page pamphlet on safety campaign suggestions. The booklet shows how electric railways working through employees, the general public, school children, motor car drivers and others, can prevent accidents and save money not only to the railways but especially to themselves. More than 200 slogans and catch lines for car cards, blotters, posters and advertisements are given for the benefit of the electric railway official who has to write advertising copy. As one official puts it: "It is one thing to plan a safety campaign and start the ball rolling, but to make it successful—to make the dreams come true—calls for 95 per cent perspiration."

## Final Touches Put on Buildings and Structures Committee Report

THE buildings and structures committee of the Engineering Association held a meeting at the Emerson Hotel, Baltimore, Md., June 13 and 14. Those present were D. E. Crouse, Rochester & Syracuse Railroad, chairman; N. E. Drexler, Newport News & Hampton Railway, Gas & Electric Company, and J. R. McKay, Indiana Service Corporation. The chairman of the sub-committee on design of a typical shop presented his report and explained the details of the several conferences which have been held with the equipment committee. This report was reviewed and prepared for final submission to the other members of the buildings and structures committee. The sub-committee on equipment for prepayment and postpayment of fares submitted a report which represented the views of Mr. Hughes of the Transportation and Traffic Association and of the buildings and structures committee. This report was also put into final form for submission to the general committee.

A draft of the probable nature of the joint report on the subject of wood preservation was presented by the chairman of that sub-committee and was thoroughly discussed. All reports will be put into final form as soon as possible for submitting to the various members of the committee.

## Chicago Elevated Section Holds Final Session

H. M. CRUNDEN, special agent Illinois Bell Telephone Company, was the principal speaker at the last meeting of company section No. 6, held by the Chicago Elevated Railroads on June 21. The warm weather kept down the attendance to eighty. Mr. Crunden, in an illustrated talk on "The Progress of the Bell Telephone Company," outlined the steps in the training of its switchboard operators. He also elaborated on the complexities of the modern switchboard and described the methods of combating sleet storms. High tribute was given to employees of utility companies because of the efforts they always put forth to serve and please the public.

## New Monthly Bulletins Available

THE following reports and compilations are available to member companies upon request:

Summarized Income Statement and Operating Statistics of 60 Companies.

Motor Bus Operating Costs.

Some Franchise Requirements.

Fare Reductions and Causes.

Cost of Living Studies.

Wage Reductions and Causes.

Supplement to Fare Bulletin.

Supplement to Compilation on Jitney Regulation.

Supplement to Compilation on One-Man-Car Legislation.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Unified and Concentrated Control Essential to Success

The members of the committee of Aldermen from Chicago who recently made a tour of large cities in the West presented their report to the local transportation committee of the City Council on June 30. They gave a brief résumé of conditions in Kansas City, Denver, Los Angeles, San Francisco, Portland, Ore.; Seattle, Vancouver, Minneapolis and St. Paul.

Their conclusions were as follows:

> 1. The present method of private ownership and operation qualified by public regulation has resulted in a division of control among numerous governmental and private agencies, and has led to confusion, wasteful litigation and ultimate disaster, as evidenced by the experience of Kansas City and Denver.
> 2. The operation of the street railway lines by the municipality in San Francisco has proved satisfactory to the people of that city.
> 3. The acquisition and operation of the street railways in Seattle has not proved satisfactory.
> 4. Rates of fare are necessarily determined by the character of service rendered, quality of management and the cost of financing, and the lowest rate of fare compatible with the best service can be secured only by the most efficient management and the most economical financing.
> 5. The most efficient management can be had only by unifying and concentrating control and management of the street railways, and the most economical financing by the issuance of securities that will absolutely assure payment of principal and interest.

### $200,000 Allowed for Inquiry

On recommendation of the committee, Chairman Schwartz decided to appoint a sub-committee to make a study of the traction bills which failed of passage in the last Legislature and to engage legal counsel to decide on a course of action for the coming special session of the Legislature.

The City Council failed to allow Mayor Thompson's requested appropriation of $315,000 to prosecute cases against the transportation and telephone companies, but did allow $200,000 for this purpose.

## Publicity Department Continued Unchanged

*Electric Railway Service,* issued by the Detroit (Mich.) United Railway, suspended publication with the issue of June 17, and while no definite announcements have been made, the company will continue its publicity department. A. D. B. Van Zandt, the company's publicity agent, and C. A. Drummond, associate editor of the paper, will devote their time to important matters which have developed in their department.

As noted previously in the Electric Railway Journal, changed business conditions resulting in reduced revenues with the necessary corresponding reductions in expenditures and the practice of every economy possible are among the reasons given for suspending the publication. Among these economies is the saving in printing costs.

## Franchise Modifications Suggested

### Former Cincinnati Director Points Out Weaknesses Discovered by Him in Local Grant

Drastic changes in the service-at-cost franchise governing the operation of the railway system were urged by William C. Culkins, former Director of Street Railways at Cincinnati, Ohio, in his annual report for 1920.

While Mr. Culkins gave his support to the service-at-cost plan as being sound of principle, he urged modifications in the ordinance which would give the city more power and a better method of enforcing its orders.

### Forfeiture Clause Assailed

The forfeiture clause in all railway franchises was assailed by the former street railway director. He asserted that a very weak point of this clause was that in order to gain a forfeiture of franchise the operation of cars would have to stop.

Mr. Culkins also urged that the Rapid Transit Commissioners work out a system linking up the surface lines with the proposed transit loop. Mr. Culkins said that a new grant could be made for the full period that the present franchise has to run.

Mr. Culkins advocated a larger reserve fund for the Cincinnati Traction Company. In the fixing of fares, Mr. Culkins said the city should have the right to make the rate sufficient to cover the cost of service, instead of being restricted by fixed grades. Conversely Mr. Culkins said there also should be a provision whereby the city and company might at any time agree to withhold an increase in fares if economic conditions warranted, despite the technical requirements of the ordinance.

Furthermore Mr. Culkins said the expense of the street railway commissioner's office should be paid out of the operating expense, with ample allowances for the employment of all the experts and other assistance.

Either in connection with the ordinance revision or otherwise steps should be taken at once for the proper unification of the rapid transit system with the surface lines. Mr. Culkins also recommends in his report that the Rapid Transit Commission make a study of the development of a system of motor trucks or trackless trolley feeders to connect with the stations of the proposed system and such laterals as might in that event be found desirable.

## Nothing Tangible Accomplished in New Orleans

It was generally believed that the railway settlement plan of Commissioner of Finance Murphy of New Orleans, submitted some days ago and indorsed by the Association of Commerce and the representative business men of New Orleans, would receive favorable consideration at the meeting of the Commission Council on June 28 or that the discussion might be followed by the adoption of some such plan of action in a modified form. To the surprise of not a few, however, nothing tangible was accomplished. Mayor McShane lectured the members of the Commission Council who differed with him in the stand which he anticipated they were about to take on the Murphy plan.

It was finally decided to reopen the question, *de novo.* This will delay action on the matter.

The citizens' advisory committee of forty, which was appointed by Judge Foster, whose report was turned down when submitted to the Commission Council, has been invited to confer with the Council again and help the Mayor and the Council arrive at some practical, satisfactory and enduring plan of action. The anti-8-cent fare committee and other bodies were included in the invitation.

### Hearings Less Stormy

Commissioner of Public Utilities Maloney, at the conclusion of the session, said that "the public utility mess appears to be in a worse state than ever." He failed to see where the Council could get anywhere so long as such tactics were pursued.

Federal Judge Henry D. Clayton has agreed to set July 8 as the date for hearing the petition of the railway to make permanent the injunction granted several months ago by Judge Clayton, restraining the city from interfering with the collection of 8-cent fares by the city.

The conference held on July 1 between the City Commissioners and the representatives of the committee of forty and the civic and commercial organizations of the city resulted in the adoption of a resolution providing that a committee of one from each of the organizations present meet the Commission Council on July 7, for the purpose of helping shape some definite plan of action.

Expressions of opinion from these various bodies disclosed no pronounced feeling unfavorable to the valuation placed upon the public utilities property by the committee of forty appointed by Judge Foster. The proceedings were unlike the stormy scenes that enlivened last Tuesday's meeting.

## Arbitration Board Award Less Than Company's Proposal

Wages have been fixed by the arbitration board for the trainmen in the employ of the Northern Ohio Traction & Light Company, Akron, Ohio. The decision was rendered on June 30. The new rates are to continue from May 1, 1921, for one year. Rates of pay for the various classes of service are as shown in table below.

All regularly scheduled runs are to be as near ten hours as possible and not more than 10 per cent of regular schedule runs are to exceed ten hours and thirty minutes, and no run is to be scheduled in excess of 12½ hours. Nothing contained in the award is to affect the present working conditions as to layover time. The maximum number of hours which any motorman or conductor may be called upon to work in any calendar day of twenty-four hours, are to be as fixed by statute of the State of Ohio. Any motorman or conductor working a regularly scheduled run of less than eight hours is to be paid for nine hours.

INTERURBAN

Consisting of motormen, conductors and trainmen of the A. B. C. Division, Canton-Akron Division, Canton, New Philadelphia and Uhrichsville Division, and Akron, Kent & Ravenna Division.

| | |
|---|---|
| First year's service | 48 cents an hour |
| Second year's service | 50 cents an hour |
| Third year's service and thereafter | 53 cents an hour |

SUBURBAN

Consisting of motormen, conductors and trainmen of the Akron, Barberton & Wadsworth Division.

| | |
|---|---|
| First year's service | 44 cents an hour |
| Second year's service | 46 cents an hour |
| Third year's service and thereafter | 49 cents an hour |

CITY LINES

Consisting of motormen, conductors and trainmen of the Akron City, Canton City and Massillon City.

| | |
|---|---|
| First year's service | 43 cents an hour |
| Second year's service | 45 cents an hour |
| Third year's service and thereafter | 48 cents an hour |

Other points made in the ruling are as follows:

> Whenever any schedule may be improved by shortening the hours and bettering the runs, without curtailment of the service demanded by the public, the association shall have the right to have such changes made in such schedule.
>
> The merit and demerit plan of discipline now in force on the A. B. C. and A. K. R. Division shall be continued to Jan. 1, 1922, with the understanding that all lines under the Northern Ohio Traction & Light adopt the merit and demerit system on or before Jan. 1, 1922 Should they fail to adopt same, then the merit and demerit system shall be inoperative on all lines.

The matter of the renewal of the wage contract between the men and the company came up for settlement about April 1. No agreement was reached relative to the wages and on May 1 the company put into effect a reduction of 15 cents an hour. This was followed by a seven-day strike after the men had refused to submit to arbitration.

An offer from the International Amalgamated Association was followed by the men agreeing to return to work at a 15-cent reduction with the understanding that the question of wages and the number of working hours, together with the merit and demerit system, be submitted to arbitration. The company appointed Charles Currie as its arbitrator, the men selected E. L. Crawford, East Liverpool, to represent them and the Governor of the State selected F. S. Harmon as the third man or referee.

Under the reduction of 15 cents an hour from the scale then in effect which was suggested by the company, the wages in cents per hour would have been as follows:

| | City Lines | Suburban Lines | Interurban Lines |
|---|---|---|---|
| First year | 44 | 45 | 50 |
| Second year | 47 | 48 | 52 |
| Thereafter | 50 | 51 | 55 |

This offer of the company proposed that 3 cents an hour additional over the city scale be paid for the operation of one-man city cars.

## Muddling Through in Washington

Municipal ownership of the electric railways in the District of Columbia is advocated in a bill which has been reported favorably to the District of Columbia committee of the House of Representatives. The favorable report comes from a subcommittee of the District committee. The municipal ownership bill had a margin of only one vote in the subcommittee.

The subcommittee has initial jurisdiction over bills affecting electric railway traffic. Various other bills pending before the subcommittee were reported to the full committee without recommendation. Among these bills was the Woods measure which proposes to levy an excess profits tax on the earnings of the Washington Railway & Electric Company and the Capital Traction Company after a fair return on their valuation has been allowed.

The subcommittee took no action on the bill now before the Senate which proposes to give the Potomac Electric Power Company the right to merge with the electric railway companies.

Col. Charles W. Kutz, chairman of the public utilities commission of the District of Columbia, has announced a public hearing for July 14 to consider rates of fare. In that connection William F. Ham, president of the Washington Railway & Electric Company, declared that he would ask for a zone system of fares if the commission should reduce the present rates.

**Eight-Cent Wage Reduction.**—Representatives of the Monongahela Power & Railway Company, Clarksburg, W. Va., and representatives of the Amalgamated Association have reached an agreement on the wage scale for the coming year. The men have accepted an 8-cent reduction on the hour. The scale that formerly existed was from 51 to 62 cents an hour for work in the city, while that signed ranges from 43 to 54 cents. The old scale for interurban work ranged from 51 to 63 cents an hour, while that signed fixes rates at 43 to 55 cents.

## Railroad Commission Recommends Improvements

For relief to Pacific Electric Railway's traffic problems in handling its Hollywood local service to and from Los Angeles, a tunnel outlet westerly from the Pacific Electric Hill Street Terminal to Figueroa Street, was recommended on June 15 to the State Railroad Commission by its chief engineer, Richard Sachse. His recommendation was the result of an investigation conducted by him in conjunction with the Chief Engineerr H. S. Osborne, Jr., of the Los Angeles Board of Public Utilities. The report of the engineers was submitted at a hearing in Los Angeles before the Commission, consisting of Commissioners Brundige, Loveland and Benedict.

The investigation of passenger service to Hollywood was ordered by the commission last April following conferences of civic bodies with the railroads.

Two plans for the tunnel outlet from the Pacific Electric Hill Street Terminal were suggested by Engineer Sachse. One is for a tunnel from the station coming to grade at Figueroa Street, estimated to cost $725,000, including necessary changes in the Hill Street station. The other plan is to continue the tunnel under Figueroa Street, to come to grade near First Street and Lake Shore Avenue, but do not include the cost of the right of way for the tunnel. The engineers report embodied further additional recommendations to solve the Hollywood traffic problem.

O. A. Smith, general passenger agent of the Pacific Electric Lines, submited to the commission a plan for a zone system for Hollywood, with a scale of fares that would bring an adequate return to the company.

E. O. Edgerton, former president of the Railroad Commission, represented the Los Angeles Railway Corporation's interests at the hearing, and expressed the opinion that the transportation problem in Los Angeles had resolved itself into a question of what sort of service the public is willing to pay for, as at present the 6-cent fare prevails on the Pacific Electric Lines, while the Los Angeles Railway lines have recently been allowed a 5-cent token fare or a 6-cent fare on straight rides.

The Los Angeles Railway Corporation went on record as being radically opposed to the extension of its lines into Hollywood, branding them as "duplication of service."

The hearing closed with the chief engineer of the utilities board recommending that the commission bring about an arrangement whereby city buses be placed in operation to and from Griffith Park to meet the Los Angeles Railway cars at First Street and Vermont Avenue, carrying passengers in proposed municipally operated buses to and from the park, fares to be paid either on the buses or on the cars, and transfer from one to the other to be recognized.

## Difference Over Methods

### Detroit United's Proposal to City for Taking Over Lines Now and Paying Later Is Rejected

City officials of Detroit, Mich., have rejected the last proposal for taking over the lines of the Detroit United Railway, whose purchase was approved by the voters last April. The suggestion of the Detroit United Railway was that the city take over the lines immediately and then arbitrate the price to be paid.

In a letter to the secretary of the Street Railway Commission, A. F. Edwards, vice-president of the Detroit United Railway, suggested that the city pay $1,600,000 to the Guaranty Trust Company, New York, trustee, upon taking over the day-to-day lines, or as an alternative take possession on paying to the trustee the value placed upon the property by the city appraisers, which is approximately $1,400,000, with the agreement that the whole price be arbitrated promptly under the terms of the agreement, and that the city make upon completion of the arbitration such additional payment, if any, as may be required.

Mayor Couzens stated that if the proposal went to the arbitrators a lower price might be asked by the city than that which had been offered the company. The city's offer was withdrawn.

The price first fixed by the city appraisers on the day-to-day lines under consideration was $1,339,998. Approximately 30 miles of lines are included in the thirteen pieces of construction. The company figures the original cost of these lines as $1,965,942.

No prolonged delay is expected in the matter of arbitration. The company has named Prof. Henry E. Riggs as its arbitrator and the city has named William H. Maybury as its representative. Professor Riggs and Mr. Maybury represented the company and the city respectively in arbitrating the price paid by the city in taking over the Harper Avenue line.

Joseph S. Goodwin, general manager of the Detroit Municipal Railway, has been asked by the commission to outline the best way of tying in the lines already constructed by the city with the Detroit United Railway day-to-day lines, and the Fort Street and Woodward Avenue lines on which franchises have expired and which the city plans to take over if the action meets with the approval of the voters at the next election.

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## Wages Reduced in Joliet

The Chicago & Joliet Electric Railway, Joliet, Ill., has induced its employees to accept a reduction in wages of 5 cents an hour for all who work on an hourly basis, and $12 a month for all who are employed on a monthly basis. The new scale for trainmen on the Joliet city lines is 51 cents for the first three months, 53 cents for the next nine months, and 55 cents an hour thereafter. On the suburban line from Joliet to Lockport, the wage is 57 cents an hour and on the main interurban line, 60 cents an hour. The contract signed with the men is on the open-shop basis, and time and one-half for overtime is allowed.

The traffic of the company for the first six months of the year was approximately 11 per cent less than for the corresponding period last year. A motor bus line in competition with the Chicago end of the interurban railway has been ordered by the Illinois Public Utilities Commission to cease operation. The bus company having failed to comply with this order, the interurban made a further complaint to the utilities commission, which referred the matter to the attorney-general's office, which is expected to take some action. The bus company has no certificate of convenience and necessity.

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## North Shore Reduces Wages

The trainmen of the Chicago, North Shore & Milwaukee Railroad have agreed to a reduction in wages effective from June 16, which brings the new wage scale down 10 cents an hour on each of the steps, except that the maximum rate is reduced only 9 cents an hour. The new scale is 67 cents an hour for the first three months, 68 cents for the next three months, 70 cents for the next three months and 73 cents thereafter. The wages of all other employees have been reduced in proportion to the cut in the pay of the trainmen.

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## Incline Reported to Be Safe

Following an examination, with tests of the mechanism of the Mt. Adams Inclined Plane, Bert L. Baldwin, City Engineer, reported to William Jerome Kuertz, Director of Street Railways, that the structure was in safe operation for cars of the Cincinnati (Ohio) Traction Company. Operation of the plane was suspended some time ago by order of the street railway director when an accident took place at the Lock Street end. In his report Mr. Baldwin said the use of the incline for double-truck cars was safe in his estimation.

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## Wages Reduced in Pittsburgh

Effective on Friday, July 1, wages of platform men on the Pittsburgh (Pa.) Railways were reduced from 64, 68 and 70 cents an hour to 54, 58 and 60 cents an hour. This cut amounts to about $1 a day, or 15 per cent, and makes the wages the same as of May 1, 1920.

Negotiations between the receivers of the Pittsburgh Railways and the wage scale committee of the trainmen are being continued. A conference of the receivers and the committee was set for July 5, but on that day the wage scale committee of the employees failed to meet with the receivers.

The receivers in a statement issued during the week ended July 2 declared that should arbitration be resorted to and a smaller wage cut be fixed or the arbitrators rule against a reduction of wages, the railway will pay back to the men any amount due them.

## Public Service May Run Jitneys as Feeders

If the demand for the service is found to be inviting the Public Service Railway, Newark, N. J., may establish jitney routes as feeders to its trolley lines. This statement is attributed to Thomas N. McCarter, president of the company. Nothing definite, however, has as yet been decided. Mr. McCarter is quoted to the effect that the plan has not advanced far enough to discuss the financial arrangements, but that if the company does take on bus operation the new branch of its transportation business will be financed in such a manner that there will be no failure.

# News Notes

**Wage Cut in Nashville.**—A wage reduction of 3 cents to 7 cents an hour for all trainmen of the Nashville Railway Light Company, Nashville, Tenn., has been announced by E. C. Edgar, vice-president and general manager. The rate of pay of 45 cents to 55 cents an hour has been reduced to 38 cents to 48 cents, a maximum reduction of 15 per cent.

**More Bus Lines Planned.**—The Board of Estimate of New York City has voted to authorize Grover A. Whalen, Commissioner of Plant and Structures, to put in operation a bus line from Eighth Avenue and 155th Street to the Dyckman Street ferry landing. The board also authorized bus lines from Fifth Avenue and 110th Street to Mosholu Parkway and from the Fort Lee ferry landing to Mosholu Parkway.

**City Stipulates Settlement Terms.**—The City Council of Des Moines, Ia., on June 27 pigeonholed indefinitely three ordinances proposed to place the Des Moines City Railway on a footing where it could be financed until a new franchise is negotiated and through Mayor Barton, served notice on the company that it must reduce fares substantially before buses will be eliminated from car line streets, and must bring in a complete, detailed franchise proposal before any franchise action will be taken.

**City Must Restore Tracks.** — The controversy between city officials of Lafayette, Ind., and the Terre Haute, Indianapolis & Eastern Traction Company was settled temporarily at least by Judge Ferdinand A. Geiger in Federal Court on June 23. Judge Geiger entered an order giving the city three days to replace the 15 ft. of track which was removed by the city. This will enable the railway to operate its cars by way of Kossuth Street to the interurban station. He also gave the city thirty days in which to restore 2,000 ft. of tracks in Main Street.

# Financial and Corporate

## Nearly All Companies Reported in "Chronicle" Show Increase in Gross Over Last Year

The statistics in the accompanying table are from the *Commercial and Financial Chronicle* for June 25 and give the gross earnings of the electric railway companies reported in the regular weekly list of public utilities for which the *Chronicle* publishes monthly figures. All of the electric railway properties listed in that department were included except those whose monthly earnings are less than $100,000, or where the company supplies a combined utility service and the greater part of the earnings comes from electric lighting and power.

GROSS EARNINGS OF VARIOUS COMPANIES SINCE JANUARY 1 THIS YEAR AND LAST YEAR

| | Period Ended | Current Year | Previous Year |
|---|---|---|---|
| Brooklyn City R. R. | March | $2,664,937 | $2,401,385 |
| Coney Island & Bklyn | March | 576,989 | 529,209 |
| Nassau Elect., Bklyn. | March | 1,113,119 | 1,450,105 |
| New York Consol..... | March | 5,316,987 | 5,085,766 |
| Bklyn. Qu. Co. & Sub. | March | 428,462 | 418,154 |
| Chattanooga Ry. & Lt. | April | 447,313 | 432,639 |
| Cumberland Co. (Me.) P. & L. | April | 1,058,719 | 940,752 |
| Duluth-Superior Trac. | May | 756,624 | 809,054 |
| East St. Louis & Sub.. | April | 1,375,619 | 1,338,745 |
| Georgia Lt. P. & Rys. | April | 577,234 | 564,879 |
| Harrisburg Railways. | April | 560,964 | 563,016 |
| Hudson & Manhattan. | May | 4,343,186 | 3,468,496 |
| Illinois Traction | April | 7,450,003 | 6,751,171 |
| Interboro Rap. Tran. (total sys.) ...... | May | 23,675,145 | 22,986,332 |
| Lake Shore Elec. Ry | April | 816,064 | 995,044 |
| Nashville Ry. & Light | April | 1,283,371 | 1,220,313 |
| Newp. N. & H. Ry. G. & E............... | April | 1,112,164 | 1,030,043 |
| N. Y. & Queens Co.... | March | 279,856 | 233,556 |
| N. Y. Railways...... | March | 2,260,010 | 1,793,018 |
| Eighth Avenue, N. Y. | March | 277,737 | 163,592 |
| Phila. Rap. Transit... | May | 17,987,696 | 15,475,733 |
| Port. (Ore.) Ry. L. & P. Co............. | April | 3,399,221 | 2,958,907 |
| Porto Rico Railways.. | March | 340,885 | 316,951 |
| Reading Trans. & Lt. Sys.............. | April | 963,174 | 946,793 |
| Third Avenue System. | April | 4,310,722 | 3,499,666 |
| Twin City Rap. Trans. | April | 4,717,181 | 4,135,037 |
| Virginia Ry. & Power | April | 3,419,192 | 3,111,072 |
| Winnipeg Elect. Ry... | March | 1,487,578 | 1,400,625 |

## Reduction in Taxes Urged

The Chamber of Commerce, of Kansas City, Mo., in extensive resolutions urging reduction in taxes for the Kansas City Railways, points to the distinction between a public utility of this kind and an ordinary business enterprise. The resolutions make plain the fact that street railways can be turned to no other use than that for which they were built, while most other businesses can turn the property to other than the original uses.

The resolutions constitute a clear and complete picture of the value and relation to a community of its street railway system. They further demonstrate that taxes should be reduced because of the reduced value of the property as reflected in the selling price of the securities.

It is the opinion of the Chamber of Commerce that a valuation based on about the lowest permissible percentage of market value of its outstanding securities is the maximum basis of taxation in the public interest under the present emergency conditions; that the maximum measure of relief by reduction of taxes of all kinds, even to the extent of complete remission of them, for the time being, if that were possible, would be for the best interests of the public, and that increased taxes must be reflected in increased fares if good service is to be continued.

In conclusion it is resolved that a copy of the resolution be sent to each member of the State Board of Equalization, and that the members of that body be urged, for the sake of the best interests of the people of Kansas City, to give serious consideration to the conditions and propositions set forth by the Chamber of Commerce, and to grant the fullest measure of relief within their powers.

## Receiver of Atlantic City Road Discharged

A. J. Purinton has been discharged as receiver of the Atlantic City & Shore Railroad, Atlantic City, N. J., on application in the United States District Court before Judge Rellstab. The company was placed in the hands of Judge C. L. Cole as receiver on Nov. 26, 1915. Mr. Purinton succeeded Mr. Cole as receiver on June 9, 1919 The appointment of a receiver followed inroads made into the receipts of the company when fleets of jitneys started to operate on Atlantic Avenue, Atlantic City, occupied by the railway. It is alleged the company lost $84,000 in the first eight months in competition with the jitneys. Subsequently the city ruled the jitneys off the main thoroughfare, shunting them to Pacific Avenue, which parallels Atlantic Avenue. That aided the railway, but it is said the principal factor in restoring the credit of the company has been the fact that for more than a year the company has been operating most successfully under a 7-cent fare.

## $39,403 Surplus in Seattle in May

The Seattle (Wash.) Municipal Railway showed a surplus of $39,403 for May. The number of passengers carried was 8,202,955, compared with 10,838,603 in May, 1920. Car miles decreased from 1,341,380 in May, 1920, to 1,285,153 in May, 1921. Cost of operation per car mile in May, 1921, was 28 cents, and per car hour $2.58, as against 31 cents and $2.77, respectively, last year.

Total revenues for the month were $530,148, and total operating costs $361,927. The revenues exceeded the operating costs by $168,221. Out of this sum $128,818 has been set aside for interest and depreciation funds.

## California Railroads to Challenge Validity of King Tax Bill

Announcement has been made that the Southern Pacific Company and Santa Fe Line would file a suit in the Federal Court to test the validity of the King tax bill, which was passed during the last Legislative session of the State of California, increasing the state tax rate on the gross receipts of steam railroads and electric railways from 5¼ to 7¼ per cent. As an aftermath of the announcement of the Southern Pacific officials of its intent to file suit, the State Board of Equalization on June 14 announced that it would deny the protest of the Southern Pacific and Atchison, Topeka & Santa Fé against the use of the 7 per cent rate.

It was declared in a statement issued by the board through its secretary, M. D. Lack, that the proposed suit will be a legal test of the method, or the so-called Seavey formula, used to determine tax rates on corporations. In the event the railroads were successful in their attack on the King bill, the reductions in tax rates would necessitate an ad valorem of 22 to 25 cents per $100 on general property to make up the deficit, the statement said.

The passage of the King tax bill was reviewed in the ELECTRIC RAILWAY JOURNAL of March 5, 1921, page 464.

## New Issue of Bonds Offered

The Columbus, Delaware & Marion Electric Company, Columbus, Ohio, will immediately float a bond issue to the amount of $500,000 under a new general mortgage to secure $1,822,000 of 8 per cent bonds covering all the property owned by the company. This mortgage was recorded at Marion, Ohio, on May 17. The first and refunding mortgage securing the 5 per cent gold bonds due 1937 is closed so far as additional bonds in the hands of the public are concerned, as no bonds can be issued except as they may be deposited as security for the new general mortgage or issued for the purpose of refunding the present divisional bonds which are now outstanding.

## Rhode Island Receivers Will Pay $1,000,000

Justice Tanner of the Superior Court in a recent decree ordered the receivers of the Rhode Island Company to pay $1,000,000 to Cornelius S. Sweetland, receiver of the United Traction & Electric Company. This is a reimbursement sum for the use of the properties of the Union Railroad, Pawtucket Street Railway and the Rhode Island Suburban Railway since the operation under the receivership. The United Traction & Electric Company owned all the capital stock of these companies. A decree of the court provided a payment on the part of the Rhode Island receivers, for the use of these properties a sum to be determined by Richard E. Lyman, master in chancery.

## Neither an Electric Company Nor an Electric Railway Among Them

The *Wall Street Journal* in its issue of June 30 lists sixty-two of the more important companies that have ceased paying dividends since the first of the year, giving the capital outstanding and losses to security holders based on the last or usual dividend rate. The total capital outstanding of the companies is $978,366,953, exclusive of stock having no par value, while the dividend payments omitted total $23,040,897. In this long list there is neither an electric company nor an electric railway.

## Desire to Foreclose Ohio Electric Railway

The Fidelity Trust Company, Philadelphia, Pa., trustee under the mortgage securing the second and general 5 per cent bonds of the Ohio Electric Railway, has filed an intervening petition in the case of the railway in the Federal Court at Toledo, Ohio, asking for the sale of practically all of the property to satisfy its obligations of $5,000,000 under the mortgage securing the bonds.

The bonds were issued on June 2, 1913, against all of the property owned by the company. They bore interest at 5 per cent, payable semiannually. Failure to pay interest within ninety days constituted default under terms of the mortgage according to the petition.

The clauses in the trust agreement describing the property covered indicate all of the system from Zanesville through Columbus and Springfield to Toledo.

Receiver B. J. Jones, Columbus, asked recently for the partition of the Ohio Electric system into its subsidiary lines.

The city of Columbus intervened to protect a claim due on a lien on the property within the city limits there. Clarence P. Steiner also filed to protect a damage judgement of $600 against the company.

The court has issued no orders in the matter yet.

## Sufficient Revenue Not Provided by Present Fare

The International Railway, Buffalo, N. Y., recently outlined its program and policy of 1921. The six months' report, January-June, 1921, now in course of preparation will show, according to President H. G. Tulley, that the company will do little more this year than meet its fixed charges after providing in its operating expenses the full annual allowance of $1,016,000 for depreciation and renewals, in accordance with the Public Service Commission formula.

Industrial depression has been felt very much in Buffalo. This is noted in the traffic handled on the lines of the International Railway. It is estimated that 1,300,000 fewer passengers are being carried a month than during the first six months of 1920.

The statement of the company says in part:

> The program of repaving, undertaken by agreement with the city of Buffalo and other municipalities, requires during this year the rebuilding of more than 20 miles of track construction, of which 13 miles is entirely new and the remainder rebuilt to conform with city paving requirements. This, with 50 miles of trolley wire renewals, complete overhauling of more than 300 cars and other necessary improvements and additions to property, will require a total expenditure approximating $2,000,000.

## $1,330,000 for Improvements

In an ordinance drafted by T. J. L. Kennedy, first assistant corporation counsel, for the public utilities committee of the City Council, provision is made for eight street railway extensions, the purchase of fifty additional cars for the Seattle Municipal Railway and the acquisition of all the railway properties of the Western Washington Power Company within the city limits.

The proposed ordinance has been prepared on recommendations from the railway department. It is intended to cover the betterments now contemplated by General Superintendent D. W. Henderson and the Council. The estimated cost of the proposed improvements has been placed at $1,330,000. The Council would be authorized to issue and sell negotiable bonds to that amount.

The Western Washington Power Company line referred to is the Greenwood Avenue line, 2.28 miles in length, operated by the city since Jan. 1, 1920, on an agreement with the owners that when a bond issue was called, it would be purchased at the Council's appraisal.

## Montreal Tramways Loses Appeals

The Montreal (Que.) Tramways was unsuccessful on June 28 in two appeals before the Court of Appeal which was asked to sanction the addition of $534,055 and $243,596 to the capital of $36,286,295 upon which the company has a right, under the existing contract with the city, to exact a revenue of 6 per cent per annum.

The first appeal was from a decision of the late president of the Public Service Commission of Quebec, dismissing the company's appeal from a ruling of the Montreal Tramways Commission, rendered on Aug. 25, 1919, deducting the sum of $534,055 from the capital on which the appellant has a right to 6 per cent interest.

In the second appeal, the tramways protested against judgment dismissing an appeal to the president of the Public Service Commission from a decision of the Tramways Commission which refused to add to the capital upon which the company has a right to 6 per cent interest, the sum of $243,516.

Under the statute covering the Public Service Commission, appeals lie to the Court of Appeal only on questions of jurisdiction and questions of law. In this case, therefore, the finding of the fact was accepted without question.

# No Rights Over Rentals

### Pennsylvania Court, in Significant Ruling, Opposes Inquiry Into Rental Payments Under Leases

The Supreme Court of Pennsylvania on July 1 denied the right of the Public Service Commission to inquire into the reasonableness of the approximate $10,000,000 annual rentals paid to underlying companies by the Philadelphia Rapid Transit Company.

In an opinion written by Justice Alexander Simpson, Jr., the court, in essence, declares that what a public utility such as the Philadelphia Rapid Transit does with the money it receives by way of "reasonable return for the service it furnishes" is no concern of the Public Service Commission or the public.

If the Philadelphia Rapid Transit, from the rates which it is authorized to collect, is not able to pay its fixed charges (of which the rentals are a part), and at the same time maintain or extend its service and facilities, that also is no concern of the commission or the public, says the court.

The opinion proceeds to point out that the underlying companies are not "operating" companies and that they do not render "service" or "make or collect rates," and consequently are not amenable to the commission. Says the opinion further:

> No contract made by a public utility is subject to a direct attack and revision, unless it is in itself a rate contract; and no contract may be indirectly reviewed in such cases, unless it has some relation to one or more of the elements to be considered in revising the rate * * * Fixed charges for franchises and assets long since acquired and now entitled to be retained only by continuing the payments provided in the lease thereof are not among those elements * * *
>
> Besides, neither the commission nor the public has anything to do with the disposition of the rates which the utility is authorized to collect nor is it any concern of either that the sum total thereof may not be sufficient to enable the operating company to pay its fixed charges and maintain or extend its service and facilities. The company is entitled to receive a reasonable return for the service it furnishes, and no more; the public is entitled to receive an adequate return for the reasonable rates it pays, and no more.
>
> Beyond making sure of these two things, the statute does not vest a greater power in the commission, so far as the matter under consideration is concerned. It has ample authority to see that its orders, as to service and facilities are fully complied with by the Philadelphia Rapid Transit Company, if the effect of so doing is that the latter's stockholders receive no return on their investment, because of the necessity for compliance with the terms of the leases, this concerns them alone, and not the complainants or the public.
>
> Moreover, if the statutes give to the commission the power to reduce these rentals, it may also increase them, a conclusion which would be a great surprise to everybody and against which, if decreed, these interveners would be among the first to complain. As the matter now is, the law gives neither right, and hence the commission should at once have halted this attempt to induce it to exceed its powers. * * *
>
> It follows that appellee was right in objecting to interveners' attempt to subject the rentals to the jurisdiction of the commission, but was wrong in supposing the remedy for its error in not dismissing the intervening complaints was by appeal.
>
> The decree of the Superior Court is reversed, the appeal from the order of the Public Service Commission is quashed and the record is remitted to that body for further proceedings according to law.

Counsel for the underlying companies say their contention has been upheld.

## Important Pamphlet Issued by Bank

To stimulate the interest of investors in securities of public service corporations and to help the continued development of the utility industry as of vital importance to the material welfare of the people, the National City Company, New York, N. Y., recently issued a booklet, "The Giant Energy," which presents the public utilities of today as an attractive field for the discriminating buyer of high-grade, carefully investigated securities. In an interesting and novel way "The Giant Energy" tells the story of electric light and power development and in illustrations of household articles electrically operated, generating stations, powerful locomotives hauling long trains over the "Rockies" and Cascades the impressive record of progress in this industry is shown. The booklet will encourage the man with funds for investment to give careful consideration to the fundamental soundness of the business which stands behind public utility bonds. In conclusion the pamphlet says:

> Before the war public utility securities issued by corporations of undoubted strength and based on sound values and earning power were sold on a basis to yield around 5 to 5½ per cent. Now with largely increased values and increased demand for output the same class of securities can be bought on a basis to yield from 6½ to 8 per cent. Discriminating investors are now analyzing the public utility situation and buying well-secured bonds. Such analyses should pay investors through strong security and liberal return from well-selected public utility issues.

## Financial News Notes

**Railway Changes Name.**—The Durham (N. C.) Traction Company, organized and operating since 1901, certified with the Secretary of State about a month ago to a change in name to the Durham Public Service Company.

**Preferred Dividend Passed.**—The directors of the Duluth-Superior Traction Company, Duluth, Minn., have passed the preferred dividend of 1 per cent. The company has been paying its preferred dividend since January, 1901. The payment of the company's common stock dividend was stopped in October, 1918.

**Municipal Line at Tacoma Still Behind.**—According to a report filed by City Comptroller John M. Roberts of Tacoma, Wash., the municipal railway there lost $2,334 in cash in May, and has a total deficit, after inclusion of all charges for interest, taxes and depreciation, of $5,724. Receipts were $8,069 and expenses $10,404.

**Recently Sold Property Reorganized.**—The Sunbury & Selinsgrove Electric Street Railway, Sunbury, Pa., a part of the system known as the Sunbury & Susquehanna Railway, was recently reorganized with a cash capital of $120,000 and a bond issue of $230,000. The property was sold at receiver's sale a few months ago.

**Protective Committee for Seventh Avenue Holders.**—A protective committee to represent the holders of the first consolidated mortgage 5 per cent gold bonds of the Broadway & Seventh Avenue Railroad, New York, N. Y., has been formed with the Metropolitan Trust Company as depositary. The committee is headed by Harold B. Thorne, vice-president of the Metropolitan Trust Company.

**Traffic Increases in 1920.**—According to the fifteenth annual report of the Pacific Gas & Electric Company, Sacramento, Cal., 1920 was a peak year for the railway system. There were 15,770,295 passengers carried, a gain of 1,690,923 over 1919. Jitney competition had spent itself on account of local enactments and the railway showed a remarkable gain in business in contrast to 1914, when jitney competition greatly diminished the company's revenue.

**Operating Arrangement to Be Renewed.**—The Dallas (Tex.) Railway will again take over the line of the Standard Traction Company, now serving Mount Auburn and Parkview additions to the city of Dallas on the East. The lines of the Standard Traction Company are now being operated by George P. Dunlap as receiver under orders issued by the District Court of Dallas County. Final details of the agreement between the companies remain to be worked out.

**Messrs. Milner and Nicklett, Directors.**—At a meeting of the board of directors of the Community Traction Company, Toledo, Ohio, recently, A. P. Nicklett, secretary, auditor, and purchasing agent of the company, was elected a director. The board also elected W. L. Milner, formerly chairman of the commission which drafted the cost-of-service ordinance, a member to represent the public interest in the company. From time to time additional directors shall be elected to represent the city.

**Settlement Proposal Made.**—A proposal which may solve the railway problem in Lafayette and West Lafayette, Ind., has been made to the city by Clarence H. Geist, president of the Northern Indiana Gas & Electric Company. The gas company has an option on the railway and offers to exercise the option if the citizens will raise $100,000 to help finance the project. The gas company would turn the railway over to the Terre Haute, Indianapolis & Eastern Traction Company for operation. Regulation of the jitney traffic also is asked.

**Right to Abandon Service Denied.**—The City Council of Sheridan has denied the application of the Sheridan (Wyo.) Railway for permission to abandon service in Montana and Summer Streets. The Council acted in accordance with public petitions and remonstrances against the suspension. General Manager Jones has stated that the suspension did not depend upon a paving problem, but was one of economy in operation as it could be shown that the entire city system was a non-paying proposition. He said that he would take the matter before the Public Service Commission and if relief were denied to him he would resort to the courts.

**Reorganization Cost $434,400.**—While declaring that certain charges and disbursements in the reorganization plan of the United Railroads, San Francisco Cal., appeared to be excessive, the Railroad Commission in a decision on June 27, held that it was without jurisdiction to pass upon the expenditure, as the funds to be used were not subject to the commission's control. The reorganization expenditure aggregates $434,400. This sum has been accumulated out of net earnings, made possible by non-payment of interest on bonds. In this way, the commission points out, the bondholders are really standing the cost.

**Reorganization Plan About Ready.**—Talk has been renewed recently of the coming reorganization of the San Francisco-Oakland Terminal Railways, Oakland, Cal. The San Francisco *Bulletin* of June 23 said: "The definite information as to the details of reorganization and refinancing were not obtainable, but it was admitted that such a move was under way. President Alberger said that the directors have been meeting with San Francisco financiers three times a week for the past six months and that while the plans are practically adopted the company is not yet ready to make the details public."

**Railway Extends Notes.**—The holders of the $750,000 of one-year 6 per cent notes of the Chattanooga Railway & Light Company, Chattanooga, Tenn., which matured on June 1 are offered a new one-year 8 per cent note in exchange for their maturing notes. In all other respects except rate of interest and maturity the new notes will be identical with the present ones. The notes will be secured by deposit of $682,000 Chattanooga Railway & Light Company's first and refunding mortgage 5 per cent gold bonds and $389,000 Lookout Mountain Railway's first mortgage 6 per cent gold bonds.

**Brooklyn Employees Buy Bonds.**—Approximately 1,000 employees of the surface lines of the Brooklyn (N. Y.) Rapid Transit Company have joined the National Thrift System and subscribed for nearly $100,000 in bonds. The drive was started on May 10. The employees of the rapid transit lines will be solicited during the current month. G. L. Terhune, who directed the campaign, expressed his appreciation for the men's co-operation. The *Brooklyn Rapid Transit Monthly* in commenting on the bond movement said that Mr. Terhune's talks on the value of systematic saving were directly in line with the campaign now under way for power saving: "Saving power, saving material, saving money—the three made a well-rounded thrift campaign of vital interest to every one at the meetings."

# Traffic and Transportation

## Six Cents in Knoxville

### Original Application Denied—Commission Abrogates Contract for Engineering Advice

The Tennessee Railroad & Public Utilities Commission recently issued an order allowing the Knoxville Railway & Light Company, Knoxville, Tenn., to charge a 6-cent fare, effective July 3. The original application of the company was for a 7-cent fare and a 2-cent transfer charge. As noted in the ELECTRIC RAILWAY JOURNAL for July 2, this was denied, the commission holding that the company had not set up sufficient reason for such an advance.

The commission also abrogated the contract between the Knoxville Railway and the American Cities Company by which heretofore the Knoxville company has been paying 3 per cent of its gross income to the American Cities Company for operating and engineering advice. The commission held that the practice at present in existence of the company's paying to another corporation any percentage of its gross receipts for operating and engineering advice shall be discontinued on June 30, 1921.

The company was also directed in the order to furnish light and power to all consumers at standard rates thereby eliminating the discrimination which appears in contract rates. There probably will be later hearings before the commission to adjust these rates. The order of the commission in part follows:

> That the company may from and after midnight of July 3, charge a maximum fare on its railway system of 6 cents for each continuous ride upon the same car between any two points upon the railway lines of the Knoxville Railway & Light Company, where 5 cents or less is now being charged, and the Knoxville Railway & Light Company shall give transfers without charge, the use of such transfers to be governed by conditions in effect prior to this order.
>
> The Knoxville Railway & Light Company shall on or before Aug. 1, 1921, file with this commission a standard schedule of electric light and power rates.
>
> All bills rendered for electric light and power consumed during the month of July, 1921, and billed on or after Aug. 1, 1921, shall be billed at the rate set forth in the standard schedule of rates filed with the commission. In other words, rates for electric light and power shall remain as at present, except in those cases, whether under contract or not where service is being rendered at more or less than standard rates, the rates to said customers being served at more or less than standard rates shall be decreased or increased to conform to standard rates.
>
> The company shall furnish to the commission at as early date as possible a statement showing in detail the cost of the appraisal of this property, segregating these costs as between engineers and their assistants, employed by the Knoxville Railway & Light Company and the engineers and assistants representing the Tennessee Railroad & Public Utilities Commission. After the receipt of this report by the commission such an order will be entered as to the disposition if these costs as may later be determined by the commission.
>
> The object of this order is to place the operations of the Railway & Light Company on a service-at-cost basis, so that the patrons of the company shall pay for service only such rates as will provide sufficient funds to pay all operating expenses and take care of an adequate amount of renewals and replacements and render a reasonable return on the investment.
>
> The commission reserves the right to amend or modify this order from time to time in the future as the necessities of the case may demand.

Accounts of the Knoxville valuation were given in the ELECTRIC RAILWAY JOURNAL for May 21, 1921, page 970, and Dec. 25, 1920, page 1302.

## Six-Cent Rate to Be Continued One Year

The 6-cent fare for the Dallas (Tex.) Railway has been continued in effect under an ordinance passed by the City Commission of Dallas. While the traction company will accept the new fare ordinance, according to Richard Meriwether, vice-president and general manager, the terms are somewhat disappointing and the company has not been granted just what it had asked for. The traction company had sought a continuance of the 6-cent fare for an indefinite period, leaving the city to revoke it at any time the commissioner might see fit. However, as adopted the fare ordinance continues the 6-cent fare for a period of twelve months and makes no provision for its continuation beyond that date.

According to Mr. Meriwether, the company will not be able to rehabilitate its finances within one year, especially when there is no guarantee of income after one year. The company will accept the new fare ordinance, however, Mr. Meriwether said, with a desire to co-operate with the city and do everything possible to improve the street car service. Reference to the company's application for a continuation of the 6-cent rate was made in the ELECTRIC RAILWAY JOURNAL for June 25.

## Commission Suspends Rate Advance

In an order recently issued, the Oregon Public Service Commission suspended until Oct. 1 operation of the new tariffs increasing the fares on the lines of the Southern Pacific Company in Salem, Eugene and West Linn. The commission announces that an investigation would be prosecuted to determine the reasonableness of the rates included in the proposed new schedules. The Salem company and the West Linn company propose to increase single-ride fares from 5 to 8 cents, while the Eugene company, in addition to asking an advance from 5 to 8 cents on its city lines, sought to raise the rates between Eugene and Springfield from 10 to 16 cents. The new tariffs would have become operative July 1, had not the order been issued. The application for increased rates was filed with the commission several months ago, the companies claiming at that time a 7 per cent return on the investment.

## Emergency Proved

### Court Holds New Jersey Company Was Justified in Seeking Ten-Cent Rate —Difference Over Emergency

Holding that the increase in its rate of fare from 7 cents to 10 cents sought by the Public Service Railway was in a large measure justified, the New Jersey Supreme Court on July 1 handed down an opinion setting aside the decision of the Board of Public Utility Commissioners denying the increase. The court also remanded the case back to the commission for further consideration "in order that it may fix a just and reasonable rate based on the evidence in this particular proceeding."

The increase to 10 cents was asked as an emergency rate, but the commission in denying the application held that the emergency was gradually passing with the improvement in economic conditions. Justice Bergen, who wrote the opinion by the court, maintained that the railway was entitled to sufficient revenue to relieve its straitened financial condition. The opinion says:

> We think the evidence shows conclusively that a considerable part, at least, is just and reasonable, and that the major part is required to pay the cost of operation and maintenance, and that, without additional income to make required repairs, they cannot be made, thereby endangering the lives of passengers.
>
> A rate which does not provide for the depreciation fund imposed by the board, nor for the operating expenses of the utility company, is not, in our judgment, a just and reasonable rate, which the statute contemplates. The evidence clearly shows that the present rate under existing conditions will bankrupt the company as well as endanger the lives of its passengers for want of funds to make imperative repairs. To require a maintenance fund to be carried, and at the same time refuse an income to provide it, is, to say the least, a peculiar exercise of discretion under our statute relating to the power of fixing rates.
>
> The board treats the situation as an emergency that soon will pass. To call this situation an emergency and to refuse relief for that reason is giving a meaning to the word emergency which neither our statute nor adjudged cases warrants. Why an increased tax, enhanced cost of labor, of operation and of necessary repairs should be called an emergency is not apparent to us, either from the evidence, or conditions of which we can take judicial notice, nor, as the board did, can we assume that other conditions will shortly exist.
>
> Assuming the estimate of the board is correct, there will be a deficit of $400,000 if the service is to be efficient and safe for the public use, without taking into account the losses for 1918, 1919 and 1920, amounting to more than $1,600,000. If this be called an emergency it is one that needs prompt relief, and ought not to be postponed until the board has reached a result in another case involving the fixing of a just and reasonable rate based on valuation. The prosecutor is entitled to cost of operation and fair return on capital invested, under the statute, and to have its rights determined on the case made by it in this proceeding.

Counsel for the railway, in a brief filed on July 5 with the Board of Public Utility Commissioners in the valuation case, maintained that a 10-cent fare is the lowest that the company can charge to meet operating expenses, taxes, replacements and pay a return on its stock. The company places the value of its property for rate-making purposes at $200,898,906. This is nearly $76,000,000 higher than the valuation fixed by Ford, Bacon & Davis, acting for the state valuation commission. The brief is considered one of the most complete ever filed in a rate-making case.

# Jitney Competition Not Favored

## Connecticut Commission Believes in Protection of Existing Transportation Franchises from Unfair Competition

**The Public Utilities Commission of Connecticut has denied the application of W. A. Perrett and Christopher Glenney, brought under chapter 77 of the Public Acts of 1921 for a certificate of public convenience and necessity for operation of jitneys in competition with the trolleys and steam railroad between Hartford and Manchester, about 10 miles distant. Under the provision of this act jitneys are named common carriers and become subject to commission jurisdiction on and after July 15, 1921. The act also provides that no one shall operate a jitney until the owner has obtained a certificate from the Public Utilities Commission that public convenience and necessity require its operation.**

SEVERAL hundred cases were brought before the commission during the month of June. The first case heard involved many issues applicable to other cases and in the decision the commission outlines the general principles controlling their action, although some of the principles do not pertain specifically to this case.

### JITNEY FARE LOWEST

The rates of fare between Hartford and Manchester are 33 cents for the steam railroad, 20 cents on the trolley by use of a ticket, or 30 cents cash with a free transfer in each case, as compared to a 15-cent fare on the jitney without transfer to other lines.

The existing transportation facilities, the commission found, were capable of handling all the passenger traffic between Hartford and Manchester, although the record of rush hour service on the trolleys prior to the advent of the jitneys did show some overcrowding. The present record, however, shows many vacant trolley seats and many trolley cars operated at a loss.

The question of public convenience and necessity as between competing jitneys and street railway service over the same route is clearly raised. The street railway is operated under a franchise granted by the state, and it has been the legislative policy of the state to protect such franchises and refuse competing franchises in the original franchise territory so long as such territory is being reasonably and adequately served under the original grant.

### ADEQUATE SERVICE THE CRITERION

A certificate of public convenience and necessity for jitney operation, the commission says, is in the nature of a franchise, but without the corresponding obligations of permanency and continuity of service on the part of the recipient that is imposed upon the chartered utility companies. The granting of a certificate for jitney operation involves to a limited extent the same principles as a legislative grant to a proposed street railway in competition with already existing franchises. Such a competitive franchise should not be granted if the existing franchised company is willing and capable of giving adequate service at reasonable rates.

There then arises the question as to what extent the different forms of transportation, the speed, the rates of fare on the jitneys, affect the adequacy of service and the fulfillment of the requirements of public convenience and necessity by the street railway company. At the hearings it was not claimed that there was greater or even equal comfort riding in a jitney bus compared to a trolley car. It was shown, however, that the jitney made quicker time and charged a lower rate of fare. The speed, however, with jitneys, the commission holds, having a seating capacity of twelve or more passengers is not materially greater than the speed of the trolley car.

The tendency of jitney fares will undoubtedly be upward when a scientific count is kept of operating revenues and expenses, while the tendency in trolley fares should be downward, particularly for short haul passengers. The controlling influences should be the general public good and the general public requirements rather than individual convenience and the desire to engage in business.

It is not disputed that the street railways are absolutely essential, neither was it claimed that jitneys could supply the entire service required.

In cases where the operation of jitney service would result in the discontinuance and abandonment of the trolley service otherwise possible to exist, the commission will be inclined to refuse a certificate of public convenience and necessity until the substitute service shows more stability and permanency than at present. Even when a part of the proposed jitney route is through territory not otherwise served, if this route as a whole is competing with and destructive of trolley service, the application should be denied, provided the street railway company is capable and willing to supply adequate service. It would be highly desirable to have connecting jitney service in such unserved territory.

However, where the traffic demands have outgrown the capacity of existing transportation facilities or where there is no other form of transportation there can be no question but that public convenience and necessity would require additional or supplementary jitney service.

The public good requires permanency and continuity of service, which cannot be reasonably guaranteed by the numerous applicants for certificates to operate jitneys. If such operation proves to be unremunerative and impracticable it may be discontinued at any time by the holder of the certificate, but in the meantime the trolley may be driven into bankrutpcy, dismantled and the general public deprived of all forms of transportation.

To substantiate this argument the policy of the Pennsylvania Public Service Commission is quoted in the case of the Commonwealth Transportation Company, which wanted to operate motor vehicles in competition with the trolleys in Scranton.

### CERTIFICATE OF SERVICE OVER GIVEN ROUTE

Where an existing or proposed jitney route parallels the tracks of a steam railroad company, and in thus competing with the service rendered by that company, but on account of the limited number of trains, public convenience and necessity require jitney operation, consideration should be given to granting the certificate, to location of termini, and fixing of schedules. Jitney operation as a rule is without certain facilities, but this fact should not authorize the operators to utilize the station and station grounds of their competitors to run a schedule coincident with their train schedule.

The commission is of the opinion where a single person, association or corporation is capable, willing and equipped to supply the entire necessary service over a given route that it is for the interest of the public as well as for proper public regulation to grant a certificate to any person, association or corporation for the entire necessary service over a route rather than to issue certificates to the several different applicants thereby distributing the service, complicating the schedules, and dividing the responsibility.

For the rendition of good utility service, the party supplying the service must receive a fair financial return and also be protected against unnecessary destructive competition. If no one applicant is capable or willing to supply the entire service, it then becomes necessary, of course, to grant a sufficient number of certificates to supply the necessary service.

### SELECTION OF APPLICANTS

Where several parties apply for a certificate over the same route each of which is capable, willing and equipped to supply the entire necessary service on that route, it becomes the task of the commission to determine the party who in its opinion would supply and maintain such service.

The commission in determining or selecting such a party will take into consideration the financial responsibility, the past record of the applicant and his employees, the rendition of jitney service, the type and general maintenance of equipment, and so far as may be expressed, the public sentiment of the people in the community or territory to be served. Public sentiment is important to the extent of affording good will, which is essential for the successful operation and conduct of any public utility.

### City Firm in Stand Against Railways

The committee of citizens which attempted to bring about a settlement of the fare controversy between the two street car systems of Spokane and the City Commissioners failed to get the commissioners to concede anything although they secured from the railway people the promise of a 7-cent fare with five tickets for 35 cents. The city commissioners over the protests of a large number of citizens have issued permits to 62 jitneys to cover some ten routes, this being in retaliation for the 8-cent fare authorized by the State Commission to be charged by the electric railways. Only a partial service can be maintained at present. The case was viewed in the ELECTRIC RAILWAY JOURNAL for July 2.

Many opinions have been expressed condemning the action of the city authorities. D. L. Huntington, president of the Washington Water Power Company, sent a statement to his employees in which he reviewed the fare controversy, the offer of the company and the flat refusal by the city. He also quoted the public statement of the Chamber of Commerce in which it is said that "the car lines have shown a disposition to be fair and meet every reasonable suggestion."

### More Bus Routes Planned

At the hearing to grant certificates for convenience and necessity for the operation of independent motor bus routes held in Waterbury on June 30 the Connecticut Company announced its readiness to operate two supplemental bus routes to serve territories not now reached by trolley service. The fare on these bus routes will be the same as if they were served by rail service. Free transfers will be interchanged.

Hearings were also held during the week at New Haven, Norwalk and Stamford, but only in Waterbury does the railway believe that motor bus service is essential to the transportation needs of the community.

President Storrs said that it was only by having the sole right to do business that the railway company could give the best service. Chief of Police P. H. Smith of New Haven recommended that if the jitneys were allowed to operate they be barred from the center of the city.

Paul Russo, a real estate operator, who had a land development in the territory formerly served by the Shore Line Railway, favored barring jitneys where the Connecticut Company rendered adequate service. He pointed out that while the people complained of the Shore Line service, the minute the service was halted they demanded its restoration.

Vice-President E. G. Buckland of the New Haven Railroad opposed the operation of suburban motor bus routes to Hartford, Derby and Bridgeport and immediate points.

## Transportation News Notes

**Bus Service Started.**—The Delaware Rapid Transit Company has started a new motor-bus line connecting Delaware City, Del., with Wilmington. Hourly trips are made.

**Zone Fare Raised.**—The new 10-cent zone rate is in effect on the Milford, Attleboro & Woonsocket Street Railway's line which connects with the Rhode Island Company's line in Woonsocket. The old rate was 7 cents for single fares. Strip books are provided, giving thirteen trips for $1.

**Rules in Favor of Railway.**—The City Commission of Trenton, N. J., has defeated the resolution introduced by Mayor Donnelly calling for the establishment of a jitney line on the streets of Trenton. The commission declared that jitneys would injure the traction company by decreasing its revenue.

**Wins Fare Suit.**—The Paducah (Ky.) Railway will continue to collect a 10-cent fare as the result of a recent decision of Federal Judge Walter Evans, making permanent an injunction against the city, which sought to hold the fare at 6 cents. The city, however, may reduce the fare after the franchise expires in October, 1921, if an examination of its earnings shows the 10-cent fare is excessive.

**One-Man Cars in Cleveland.**—The Cleveland (Ohio) Railway began operating forty-two of its standard double-truck cars with one man about June 1. These cars are being run on some outlying lines and on one cross-town line where the traffic is light. Because of the high number of stops per mile on this cross-town line, the average schedule speed is only about 5 m.p.h., and the service as provided with one man on a car has been satisfactory.

**May Solve Traffic Troubes.**—One step looking toward the solution of the traffic problem in Newark was reached recently in the form of a tentative ordinance which will be introduced at the City Commission's meeting. This ordinance is the result of the efforts of Director Brennan, Traffic Captain McReil and a special committee of business men. The new traffic code will put an end to all-day parking which is considered the cause of the street congestion and subsequent interruption of traffic.

**Automobiles Lead in Fatal Accidents.** Deaths resulting from automobile accidents in California for the last three years, and for the first four months of 1921, totaled 2,305, as compared with 1,472 persons killed in all other vehicles, including steam and electric railroads and street railways, according to figures made public on June 24, 1921, by L. E. Rodd, State Registrar and Director of the Bureau of Vital Statistics. The deaths from automobile accidents for the past three years and the first four months of 1921, were as follows: 1918, 559; 1919, 685; 1920, 804; 1921, 257.

**P. A. Y. E. on All Lines.**—To establish a uniform system of collecting fares on all cars of the Cincinnati (Ohio) Traction Company, William Jerome Kuertz, Director of Street Railways, has announced the "pay-as-you-enter" system will be extended to all lines. The present system of paying when leaving the cars, in vogue on certain lines, has caused considerable confusion, Mr. Kuertz announced. It also has caused delays at the end of the routes and has multiplied the worries of the conductors. Before any final determination will be made, however, Mr. Kuertz said, the question will be taken up at a conference with the traction officials.

**Fare Issue Before U. S. Court.**—The Galveston fare fight will be carried to the United States Supreme Court. An order granting an appeal to the Highest Tribunal has been filed in the United States Court at Galveston. The suit is styled Galveston Electric Company vs. The City of Galveston. The railway is seeking relief from what is declared to be a confiscatory fare charge. An injunction against enforcement of a city ordinance prohibiting the collection of more than 5 cents as car fare is sought by the railway, which recently lost its fight in the United States District Court for the Southern District of Texas at Houston when Judge J. C. Hutcheson held that the 5-cent fare order is not confiscatory, but that the earnings of the railway under the 5-cent fare are adequate. In holding the 5-cent fare adequate Judge Hutcheson overruled the master in chancery, Judge J. O. Dannebaum.

**Increased Rates Approved.**—An increase in fare from 5 to 7 cents in each of the zones of the Burlington County Transit Company, operating between Moorestown and Burlington, N. J., has been sanctioned by the Public Utility Commission. Rates for school children heretofore in effect are continued. Children under five years when accompanied by an adult paying fare will be carried free. Children over five years must pay full fare. Inauguration of the increased fare is subject to improved service, especially on the branch between Borton's Landing bridge and Moorestown. Small dividends had been paid during the past three years, but these had been paid from earnings accumulated during previous years. The board said that this company had never been able properly to maintain its property, and in 1910, owing to inability to pay interest, the road was sold at receiver's sale, the bondholders purchasing the property for $120,000. It was testified for the board that the property was worth the amount of bonds paid for it, which at that time had a face value of $400,000. The company also submitted an appraisal of its property showing original cost of $343,004, and reproduction cost of $530,911.

# Personal Mention

**S. S. Colvin** is the successor of R. Kingseed as electrical engineer, master mechanic and engineer of overhead construction of the Tiffin, Fostoria & Eastern Electric Railway, Tiffin, Ohio.

**Wilfred E. Ervin** is now connected with the Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., as secretary. J. Elliott Newlin was previously with the railway in this capacity.

**J. L. DuVall** is the successor of John P. Dake, master mechanic of the Sioux Falls (S. D.) Traction Company and L. S. Smith has become engineer of maintenance of way following the resignation of William Adams.

**A. F. Jones** was recently appointed general freight and passenger agent of the Columbus, Delaware & Marion Electric Company, Columbus, Ohio. George H. Dusler formerly held this position with the company.

**J. Edgar Reed** has recently been appointed superintendent of the Shamokin & Mt. Carmel Transit Company, Mt. Carmel, Pa. A. Howard Thomas, Jr., formerly superintendent and purchasing agent, is no longer connected with the company.

**T. A. Darrow** was recently appointed superintendent of the Northeast Oklahoma Railroad, Miami, Okla., as the successor to E. M. Tanner. L. M. Greene is no longer connected with the company as master mechanic, E. M. Applegate having been selected for this position.

**D. G. Callihan** has been promoted from superintendent and purchasing agent to general manager of the Webster, Monessen, Belle Vernon & Fayette City Street Railway and the Westside Electric Street Railway, Charleroi, Pa. The roads were formerly managed by the president, C. F. Thompson.

**W. V. Hill**, manager of the California Electric Railway Association, has been appointed representative at Washington of the joint tax committee of the American Electric Railway Association, American Gas Association and the National Electric Light Association, according to announcement made by Philip H. Gadsden, chairman of the committee. Mr. Hill is well known because of his active participation in association affairs. During the war he was assistant manager of the American Electric Railway War Board and before that was Washington representative of the California Electric Railway Association. When the War Board was disbanded, Mr. Hill was placed in charge of the Washington office of the A. E. R. A. under the committee of national relations. Owing, however, to the urgency of his duties with the California association he resigned in May, 1919, to return to the Pacific Coast.

**F. Hoffman** has succeeded J. Morton as auditor of the City Railway Company, Dayton, Ohio.

**W. F. West** has resigned as master mechanic of the Newport (R. I.) County Electric Company. At present the position is still vacant.

## Mr. Fallon Promoted Again

### As General Manager of the Chicago Elevated He Relieves President Budd of Many Responsibilities

For the second time within a period a little longer than a year Bernard J. Fallon, assistant general manager of the Chicago Elevated Railways, has received promotion. He has just been made general manager and his duties and responsibilities have been broadened so as to relieve President Britton I. Budd of a large share of the responsibilities of operating the elevated railways, the fast interurban roads and other electric railway properties.

B. J. FALLON

Mr. Fallon held, until his promotion to assistant general manager in April, 1920, the position of engineer maintenance of way. His operating experience with the Chicago Elevated Railroad has extended over a period of fourteen years. In June, 1907, he was appointed engineer maintenance of way of the old Metropolitan West Side Elevated Railroad. After two years in this capacity he was made assistant general manager of the same road under Britton I. Budd, then general manager. When the several elevated railways of Chicago were consolidated and Mr. Budd became president of the combined system in 1911, Mr. Fallon was made engineer maintenance of way, with jurisdiction over all these combined properties. Some time later his authority was extended to include the Chicago, North Shore & Milwaukee Railroad, the operation of which had been taken over by Mr. Budd for the Insull interests.

Mr. Fallon was born on Aug. 10, 1880, at Rutland, Ill. His experience and training for his work with the elevated systems were gained largely in the steam railroad field. After receiving a B. S. Degree from La Salle Institute, Chicago, in 1898, he became a rodman with the Burlington Railroad. During the following eight years he held the position of assistant engineer, division engineer and finally engineer of track elevation in Chicago. Since his connection with the elevated systems he has served on the American Electric Railway Engineering Association way committee. He is a member and a director of the Chicago Engineers Club and a member of the Western Society of Engineers.

As was previously stated, the more intimate details of operation will now fall on Mr. Fallon. That he is well qualified to shoulder these additional burdens and make an eminent success as an operator, one needs but examine his past record of efficiency and of rapid promotion.

# Obituary

**George J. Foran**, manager of the condenser department of the Worthington Pump & Machinery Corporation and the associated companies of the International Steam Pump Company, since 1901, died on May 12. During the war Mr. Foran was a member of the committee on condensing apparatus of the United States Shipping Board and War Industries Board and also chairman of the American Engineering Service Committee of Engineering Council.

**Edward Payson Shaw** is dead. Mr. Shaw was well known in electric railway circles, more particularly in Massachusetts. He was one of the first to become convinced of the practical use of electricity and made large investments in electric plants. He equipped with electricity the Haverhill, Merrimack & Amesbury Railway. Another road in which Mr. Shaw and members of the Shaw family were interested was the Boston & Worcester Street Railway. In recent years he had confined his activities largely to real estate developments. All through his active business career Mr. Shaw retained his interests in politics and served the state of Massachusetts in many capacities, among them treasurer of the Commonwealth. He was born in Newburyport in 1841 and was educated in the public schools there and at the academy at London, N. H. He went into business at an early age and soon became interested in various transportation undertakings. Mr. Shaw is survived by two sons. James F. Shaw and Samuel J. Shaw, and by several daughters. His son James F. Shaw, now in the banking business in New York, is a former president of the American Electric Railway Association.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Steel Companies Again Reduce Steel Rates

**Lead of Bethlehem Company on July 5 Followed by Other Independents and by Corporation on July 6**

Effective July 5, the Bethlehem Steel Company has further reduced its steel products in amounts varying from $4 a ton to $10 a ton. The change in bars is from 2.10 cents to 1.90 cents; plates and structural shapes, 2.20 cents to 2.00 cents; sheet bar, $39 to $35; billets, 4 x 4, $37 to $33; slabs, $38 to $34; blue annealed sheets, 2.85 cents to 2.65 cents; black sheets, 3.75 cents to 3.50 cents; galvanized sheets, 4.75 cents to 4.50 cents; tin plate, $6.25 to $5.75. The former price change was on April 13. Previously the Bethlehem company had announced a 15 per cent reduction in wage scales and a 10 per cent reduction in salaries of employees, effective July 16.

E. G. Grace, president of the company, in his announcement declares that present manufacturing costs do not in any sense warrant reductions, but that his company desires to contribute even more than its full share to reestablish conditions in the steel trade on what may be regarded as a normal basis. He attributes the increase in freight rates as the largest factor in increasing the cost of manufacturing steel products, with materials and labor as the cost factors next in importance.

These reductions were followed by most other independent steel producers early in the week, and on July 6 the United States Steel Corporation announced a similar reduction in its products. Judge Gary also announced the abrogation of the so-called basic or overtime day, which in effect is a lowering of wage scales about 15 per cent on those men working twelve hours a day, effective July 16.

## Hickory Tool Handles Cut 15 to 20 per Cent

Manufacturers of wooden tool handles just recently reduced prices on hickory an average of about 15 to 20 per cent, the cheaper grades of wood being reduced the most. Ash handles were also cut about 10 per cent, it is stated. Some producers put these decreases in effect as early as the first of last month, others not until within the past two or three weeks.

The market during the first half of this year has held a very quiet course and at present there is not much activity with steam or electric roads either here or abroad, as consumers have been fairly well stocked up since last year. Some producers expect a change for the better this fall; others can see nothing ahead until next spring. Dealers and jobbers are buying from hand to mouth and have light stocks on the whole. Producers of wooden handles have fairly good stocks as supplies dumped on them by cancellations have not been worked off. Consequently, immediate shipments can be made. The best grade of hickory wood, however, is becoming scarce, it is stated, partly because the automobile industry has for long been making such inroads on the supply. Production is down low; about 25 per cent of normal capacity would probably be a representative figure.

## Strong Volume of Lubrication Buying

**Unlimited Supply Available as Stocks of Crude Oil Are Large—Prices Down 45 per Cent**

Buying of lubricants by electric railways holds up very well according to producers. Steam railroad demand has been flat for a long time, for with slack general business conditions fewer cars are operated, but electric traction companies must, of course, maintain their service even at a loss.

The supply of lubricating oils and greases is better now than virtually any time since the war. Producers' stocks are large and crude oil has piled up at refineries to such an extent that it has been necessary to take a loss to move stocks. Some of this surplus will now find an outlet through the automobile trade, which has been expanding ever since the opening of summer and now shapes up as a strong market, especially for fuel oil. In the fall this business will naturally fall off again, but electric railway demand is expected to hold its own. Traction companies are buying close to their requirements and, as usual, are not stocking ahead, but the low point of decreased revenue from depression in the industrial centers has been passed and from now on summer travel to vacation resorts and to the amusement parks will make itself felt.

Price is the only point upon which consumers have hesitated and this has been felt to some extent where renewals of contracts for lubrication on a mileage basis have been made, but in general no more difficulty than usual has been experienced in renewing contracts. Prices of oil are well down, the average general reduction from peak quotations on railway lubricants being about 45 per cent. As recently as the middle of June one of the largest producers reduced prices 20 per cent and on June 28 another made a cut of about 10 per cent.

## Tariffs on Electrical Goods Provided in New Bill

**Wire, Poles, Ties, Insulating Materials, Brushes, Axles, Wheels and Metals Among Items Affected**

The Fordney tariff bill, designed to afford full protection to American industries, was formally reported into the House of Representatives on June 28. It is thought that under this measure duties will be in the neighborhood of 30 per cent higher than under the existing tariff. Splitting of duties is common and the American valuation plan is the basis of lists. Paragraphs referring to the electrical industry are printed below:

Mica, unmanufactured or rough-trimmed only, 6 cents per pound and 17 per cent ad valorem; cut or trimmed. splittings, plates, built-up mica and all manufactures of mica or of which mica is the component material of chief value, 12 cents per pound and 17 per cent ad valorem; ground mica, 6 cents per pound and 20 per cent ad valorem.

Carbons and electrodes of whatever material composed and wholly and partly manufactured, for producing electric arc light; electrodes of carbon or graphite for electric furnace or electrolytic purposes; brushes for electric motors, generators, etc.; plates, rods and other forms for making into brushes; other wares not especially provided for, 35 per cent ad valorem.

Incandescent electric light bulbs and lamps, with or without filament, 35 per cent ad valorem.

Storage batteries and parts and materials, 30 per cent ad valorem.

Anti-friction balls and rollers for ball and roller bearings, and parts, 35 per cent ad valorem.

Aluminum, scrap and alloys in crude form, 5 cents per pound; in plates, sheets, bars, etc., 9 cents.

Copper wire not coated nor covered and also tin-coated, 1½ cents per pound; in rolls, rods or sheets, 2½ cents; seamless tubing, 7 cents; brazed tubing, 11 cents; brass wire, rods, sheets, etc., 4 cents per pound; seamless tubing, 8 cents.

Telephone, light, power or railway poles of cedar or other woods, and railroad ties, 10 per cent ad valorem.

Asbestos paper and millboard of long-fiber asbestos and electrical papers not exceeding 0.05 in. thick, 8 cents per pound; of other asbestos fibers, 1½ cents; sheets and plates not exceeding ⅛ in. thick, 1 cent per square foot, up to 2½ cents for over ¼-in. thickness.

Electrical insulators and other articles wholly or partly or in chief value of shellac, copal or synthetic phenolic resin, not especially provided for, 30 per cent ad valorem.

Portland, Roman and other hydraulic cement in barrels, etc., takes 5 cents per 100 pounds; in bulk, 4 cents; other cement not specifically provided for takes 17 per cent ad valorem.

Axles and parts thereof, axle bars, etc., valued at not more than 6 cents per pound, six-tenths of 1 cent per pound. Wheels for railway purposes and parts thereof, of iron or steel or steel-tired, 1 cent per pound. Axles attached to wheels take wheel duty.

Railway fish plates or splice bars made of iron or steel, ¼ cent per pound; all other railway bars of iron or steel, T-rails and punched iron or steel, flat rails, 7/40 cent per pound.

## Brake Shoe Prices Again Down

Little change is evident in the market for brake shoes in so far as demand is concerned. Buying continues light, with railways ordering close to their requirements and not stocking far ahead. Replacement buying by steam roads is especially slack because fewer freight cars are being operated owing to the low volume of business.

Prices are again down, one of the leading producers having reduced quotations $2 per ton on July 1, a cut of about 3½ per cent. This is the third decrease to be made this year, the first, of $6 per ton on Jan. 1, amounting to about 8½ per cent. The second decrease, made on April 1, was also $6 per ton.

Manufacturers' stocks at present are not extra large, but the moderate surplus supply of the finished product is sufficient to provide immediate shipments. The large number of cars now in urgent need of repairs in this country, it is stated, is sufficient guarantee that brake shoe business is bound to increase.

## Rolling Stock

**The Seattle (Wash.) Municipal Railway** will obtain fifty additional cars if the ordinance which has been drafted by the Assistant Corporation Counsel of Seattle for the public utilities committee of the City Council goes through.

## Track and Roadway

**Alabama Power Company, Birmingham, Ala.,** has been formally granted a permit for the construction of a dam and power plant on the Coosa River near Verbena. The first work to be done will be the building of six miles of railroad from Verbena to the river. The project will cost approximately $7,000,000. This undertaking was referred to in the ELECTRIC RAILWAY JOURNAL for April 2, 1921.

**Sacramento Northern Railroad, Sacramento, Cal.,** may be included in an improvement program contemplated by the Western Pacific Railroad. The railroad has under consideration the extension of the electric line from its Chico terminal to Red Bluff according to J. P. Quigley, superintendent of transportation. With the purchase of the electric line the Western Pacific plans extensions to penetrate to points that promise to be good feeders to the big line.

**San Francisco (Cal.) Municipal Railway** will extend its line to the Sunset District. Three possible routes have been suggested. One extension would run from the Market Street Twin Peaks line along Seventh Avenue to Judah Street. The second would be from Duboce Avenue and Market Street to the ocean, using a tunnel 3,400 ft. long with a connection at Duboce Avenue with the Market and Twin Peaks tunnel line. The third possible route would be on Judah Street from the ocean to Auguello Boulevard.

**Cincinnati (Ohio) Traction Company** will resume service on Aug. 1 over the East End line between Ferry and Lumber Streets. This announcement was made recently by Walter Draper, vice-president of the company. The line was abandoned several months ago in order to make a fill of 9 feet of ground. The city was compelled to condemn property on the south side of the street and raise houses on the other. When this section is completed a maximum fill of five feet will be started on another section between Corbin and Strader Streets.

**Oklahoma Union Railway, Tulsa, Okla.,** may help in the construction of an interurban terminal with a belt line around the city. While a definite route for this line was not proposed the Sand Springs Railway and Oklahoma Union Railway's lines could be utilized for this purpose by building a connection from the Oklahoma Union Railway's tracks at Fourth Street and Elgin Avenue with the Sand Springs line on East Archer Street.

**Chambersburg & Shippensburg Electric Railway, Shippensburg, Pa.,** will extend its system to the Western Maryland Railway's line.

**Houston, Bay Shore & Texas City Interurban Railway,** which proposes to build and operate an electric interurban line from Houston along the bay shore to Texas City, near Galveston, has purchased from the Pittsburgh Steel Company 54 miles of 85 lb. rails for delivery in Houston. Grading work on the first unit of the line, which will extend from the city of Houston to the San Jacinto Battlefield on San Jacinto River, a distance of about 18 miles, is well under way, according to Ed. Kennedy, president.

## Power Houses, Shops and Buildings

**New York Central Railroad, New York, N. Y.,** is considering the building of a new power house at its locomotive repair shop in Solvay.

**Oklahoma Railway, Oklahoma City, Okla.,** will start work on its new $150,000 terminal station not later than March 1, 1922. This announcement was recently made by John W. Shartel, vice-president and general manager of the company.

**Columbus, Delaware & Marion Electric Company, Marion, Ohio,** has just completed a new power plant at Scioto. This plant consists of three Babcock & Wilcox boilers, 866 hp. each with Westinghouse underfeed stokers and condenser. This project was referred to in the ELECTRIC RAILWAY JOURNAL for March 19, 1921.

## Professional Note

**C. D. Parker & Company, Inc.,** investment bankers and controlling managers of central station properties at Amesbury, Palmer, Plymouth, Franklin, Great Barrington, Marion and Provincetown, Mass., and elsewhere, have moved from 67 Milk Street, Boston, to a remodeled six-story office building at 150 Congress Street, in the heart of that city's banking district.

## Trade Notes

**The Esterline-Angus Company, Indianapolis, Ind.,** has developed a graphic kva. meter.

**The Hi-Voltage Equipment Company, Cleveland, Ohio,** has developed a new type of lightning arrester for outdoor mounting.

**The Black & Decker Manufacturing Company, Towson Heights, Baltimore, Md.,** has recently placed on the market a portable electric grinder.

**The Railway Track-Work Company, Philadelphia,** has placed on the market a new "Ajax" resistance-type arc welder.

**The Rome Wire Company, Rome, N. Y.,** has developed a "superservice" cord for portable electric tools, etc.

**The Hazard Manufacturing Company, Wilkes-Barre, Pa.,** has put on the market its new "spiralweave" cables for portable light and power service.

**The Knight Engineering & Sales Company, Los Angeles,** has placed on the market its new "One-Hand-Y" electric drill.

**Edward J. Ronan,** representative of the Gold Car Heating & Lighting Company, died at his home in Brooklyn, N. Y., on July 3. Mr. Ronan had been connected with the company for a period of twenty-one years.

**The Diamond Holfast Rubber Company, 33 Auburn Street, Atlanta, Ga.,** manufacturer of friction tape, has purchased a site of eleven acres for its proposed new factory for the manufacture of its "Diamond Holfast 2-plex" insulating tape.

**The A. H. Petersen Manufacturing Company, Milwaukee,** manufacturer of tools and dies, etc., announces that it has discontinued this department and will turn over its entire plant to the manufacture of "Hole Shooter" portable electric drills and other automotive devices.

**The Quasi-Arc Weldtrode Company, Inc., Atlantic Avenue and Warwick Street, Brooklyn, N. Y.,** announces that since July 1 it has been in its new quarters at 114 Hudson Avenue, Peekskill, N. Y. In the new location the company has not only much better shipping facilities than before but also better arrangements and machinery for the manufacture of its "weldtrodes." The new works will also be completely equipped for the manufacture of all arc-welding accessories and for the building of the entire line of welding apparatus, including controllers (for both alternating and direct current) and welding generators.

**The Standard Safety Equipment Company, 168 North Michigan Avenue, Chicago,** has been organized to manufacture and distribute electrical and mechanical safety equipment and supplies, embracing gloves, linemen's blankets, first-aid cases, etc. C. A. Kingsbury and L. W. Dickson, both formerly with F. A. Hardy & Company, are respectively president and secretary. F. L. Hurlbutt, for the last ten years safety engineer of E. I. du Pont de Nemours & Company, is treasurer and in addition will have charge of all service work. A. U. Barnes of the Hardy company has been appointed Eastern manager with offices in the Clinton Building, Newark, N. J. There is also a Detroit office at 414 West Grand River in charge of O. L. Smith. A Cleveland connection and stockroom is under consideration. In addition to safety supplies the company will market a full line of welding equipment. "Standardize for safety" has been taken by the company for a slogan.

## New Advertising Literature

**Temperature Control.**—The Fulton Company, Knoxville, Tenn., has issued two folders on its "Sylphon" temperature regulators.

**Pressure Regulator.**—The Fisher Governor Company, Marshalltown, Iowa, has issued Bulletin No. 210 on its series 90 pressure regulators.

**Temperature Regulator Chart.**—A "Temperature Regulator Chart, or Engineering Data Sheet," has been copyrighted by the Fulton Company, Knoxville, Tenn., for use in figuring tank regulators.

**Export Trade Directory.**—The *American Exporter*, 370 7th Avenue, New York City, has just published the 1921-22—the seventh edition— of the "Export Trade Directory." There are 1,036 pages in the book.

**Insulating Tape.**—The Diamond Holfast Rubber Company, 33 Auburn Avenue, Atlanta, Ga., is distributing a leaflet covering the "Diamond-Holfast" two-plex insulating tape recently placed on the market.

**Air Purifying Apparatus**—"Carrier Air Washers and Humidifiers" is the title of catalog No. 480, recently issued by the Carrier Air Conditioning Company, Buffalo, covering its air washers, generator coolers and other apparatus.

**Stoker Coal Crusher.**—The Jones automatic coal crusher for use on Jones standard stokers has been put on the market by the Under-Feed Stoker Company of America, 721 Book Building, Detroit, and a descriptive leaflet concerning it has been issued.

**Electric Specialties.**—The G & W Electric Specialty Company, 7440-52 South Chicago Avenue, Chicago, manufacturer of electrical specialties, has issued catalog 11, containing bulletin No. 211, covering its pot heads and accessories and bulletin 212, describing its underground boxes.

**Fire Protection.**—The Oil Conservation Engineering Company, Wade Building, Cleveland, is distributing a pamphlet describing the 10-gal. "Oceco" chemical engine recently developed by the company. The engine is designed particularly for use in electric power stations, transformers, relay and storage-battery stations.

PEACOCK ASKS—

*why limit safety equipment to new cars?*

**A man said to us—**

*"Your business must be pretty limited when you can only sell new brakes for newly-built cars."*

He didn't know that

**Peacock Staffless Brakes**

are going onto many a sturdy veteran car which has outlived the brakes originally installed on it. He didn't know that companies which are now converting two-man cars for really safe operation by one man are ripping out old hand brake equipment and installing Peacocks.

"The Peacock Staffless"

**Because—**

They produce maximum braking in minimum time.
They produce maximum braking with minimum effort.
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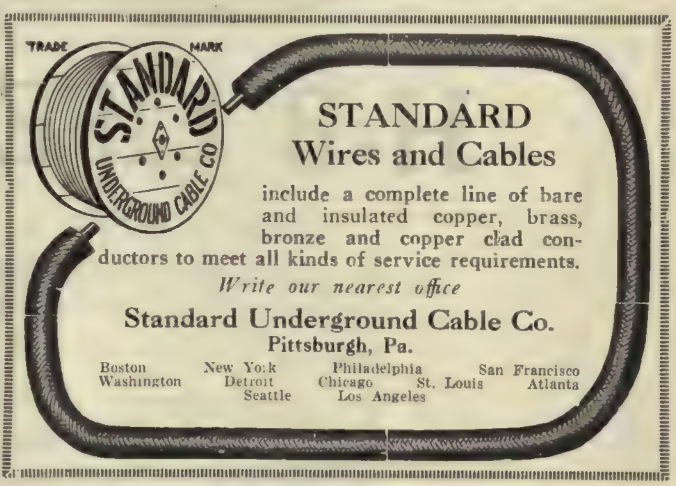

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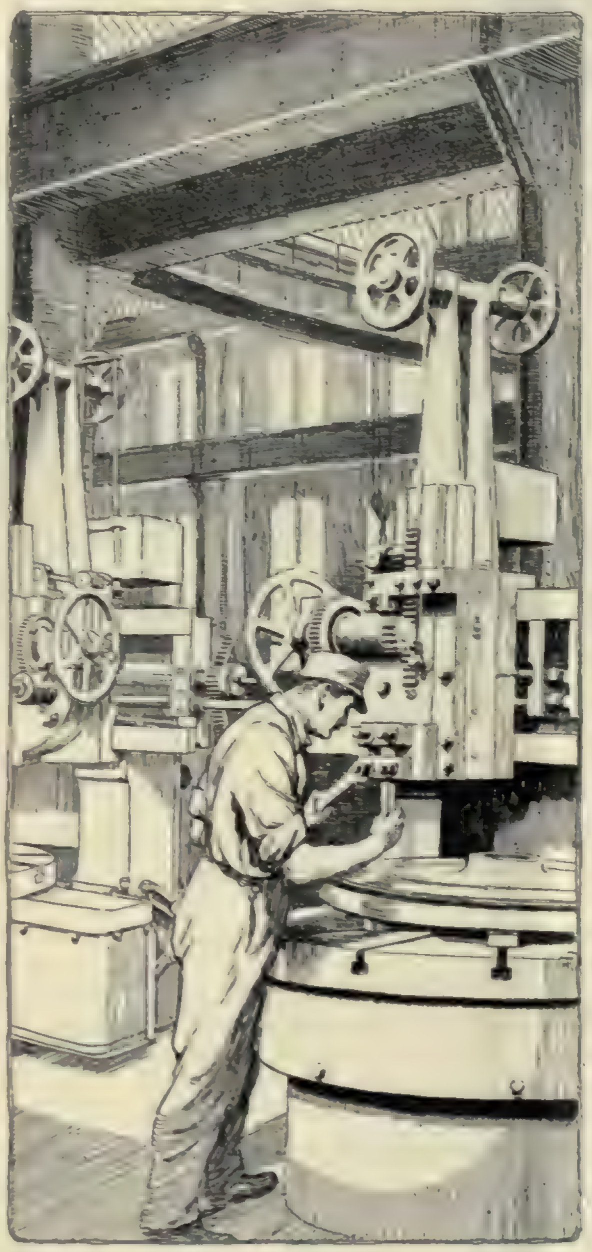

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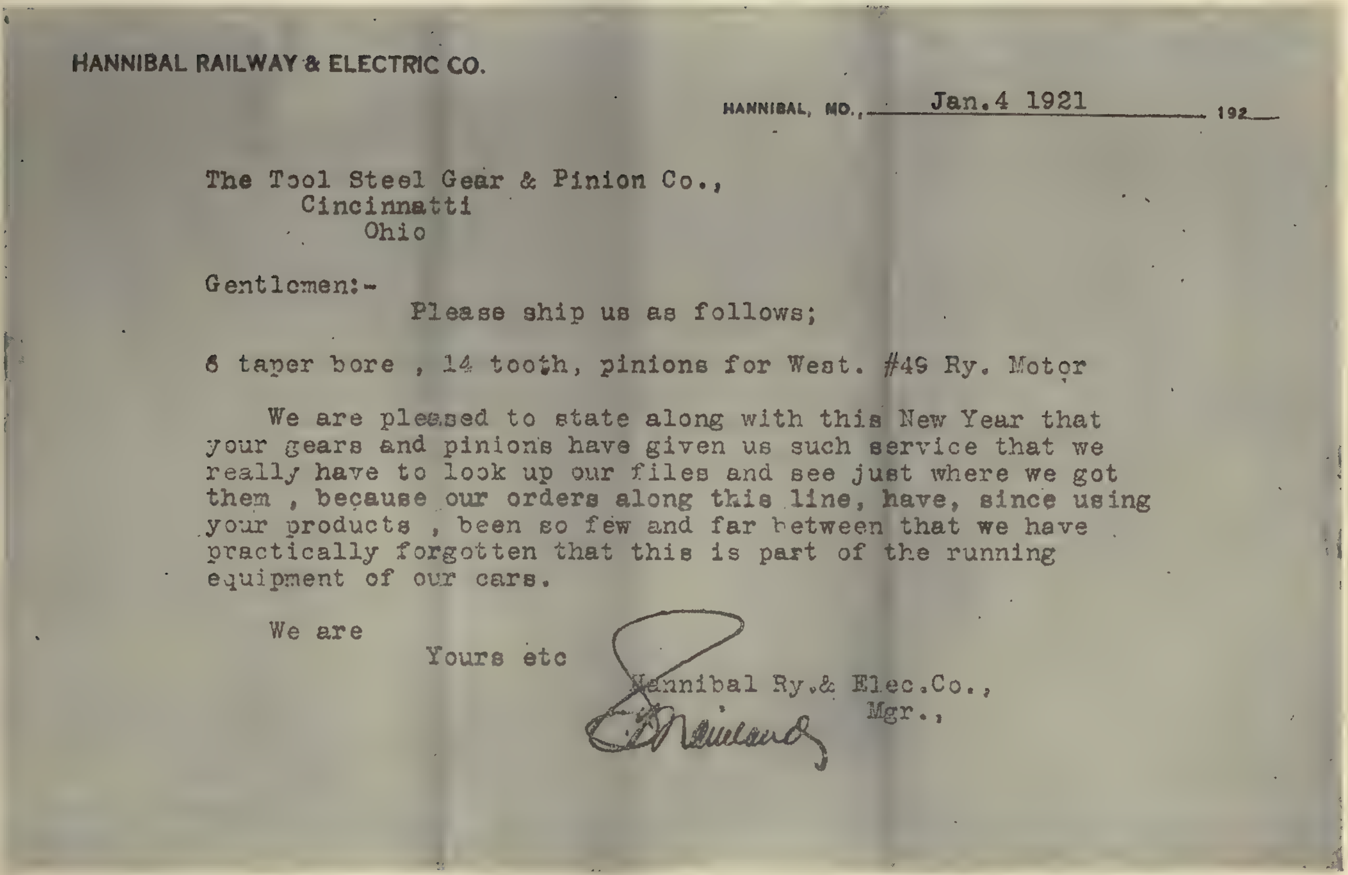

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HANNIBAL, MO., Jan.4 1921 192

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# Conditions Are Better on Several Typical Properties

CORROBORATION of the cheerful outlook for the future reflected in the recent figures of earnings of the electric railways as made public by the American Electric Railway Association is to be found in the returns which are contained in the annual reports of the individual companies for the year ended Dec. 31. These reports are now being received for review and almost without exception they show that the corner was turned some time ago. This does not mean that trying times are over. Far from it. But the returns coming in do indicate most healthy growth in gross receipts, with expenses within bounds and the prospect bright for operation in the future at lower cost.

An example or two will suffice. All the roads examined show healthy growth in gross. In one or two instances, in fact, this growth has been phenomenal. Thus one strictly interurban road shows an improvement in gross over the previous year of about $1,000,000, while the net increased only $46,000. This seems disproportionate. It is. The cheering fact, however, is that the growth of the business has been substantial and may reasonably be expected to remain constant and even to go on increasing, while there is every prospect that expenses will be reduced through decreases in operating costs, with the result that the spread between gross receipts and expenses will widen.

On another property doing a combined city and interurban railway and lighting business the gross earnings have grown from $10,521,000 in 1913 to $21,350,000 in 1920. The increase in the receipts on the interurban lines in this period has been 99 per cent and on the city lines 52 per cent. The operating ratio, which in the case of this company is always quoted inclusive of taxes, has gone from 58.8 per cent to 72.7 per cent. Even so, a return to the average operating ratio of about 60 per cent would mean a difference to the benefit of the company of more than $2,000,000. Many there are who will be apt to say that it is too much to expect an early return to the old operating ratio, yet the prospects for this property most certainly appear bright.

On still another property a saving of more than $1,000,000 was brought about at one fell swoop by a recent reduction in wages. It may be that much of the money thus saved will find its way back into the property in the nature of improvements. Even if it does, the equity of all the security holders will be increased just that much and the financial credit of the company will be bettered accordingly. Sight must also not be lost of the fact that the prospect for the further easing of money rates in the near future should result in no inconsiderable saving in interest charges to companies, when refunding is carried out of borrowings negotiated at high interest rates during the wartime competition for loanable funds. Moreover, the better morale now everywhere apparent is an advantage very often incalculable in the form of dollars and cents, but not intangible in a case such as that at Kansas City, where 900 fewer employees are this year employed in operating the largest number of cars in the history of the company.

Reports of a group of syndicate properties widely scattered geographically confirm what has been said previously with respect to the outlook of the individual properties to which reference has been made. True, the recent depression in business has affected adversely to some extent the gross receipts of a number of companies, but with a revival in trade and lower cost for labor and supplies, all companies ought soon to be in a much more healthy condition. Here and there a manager still struggling fiercely with the problem of making both ends meet may be inclined to think we are chasing rainbows, but that will be only because he has been so deeply employed in trying to steer his own ship home safely through the fog that the ray of sunshine which is penetrating the mist in the distance has not yet been discernible to him.

*—Editorial Electric Railway Journal, May 28, 1921.*

**Electric Railway Journal**

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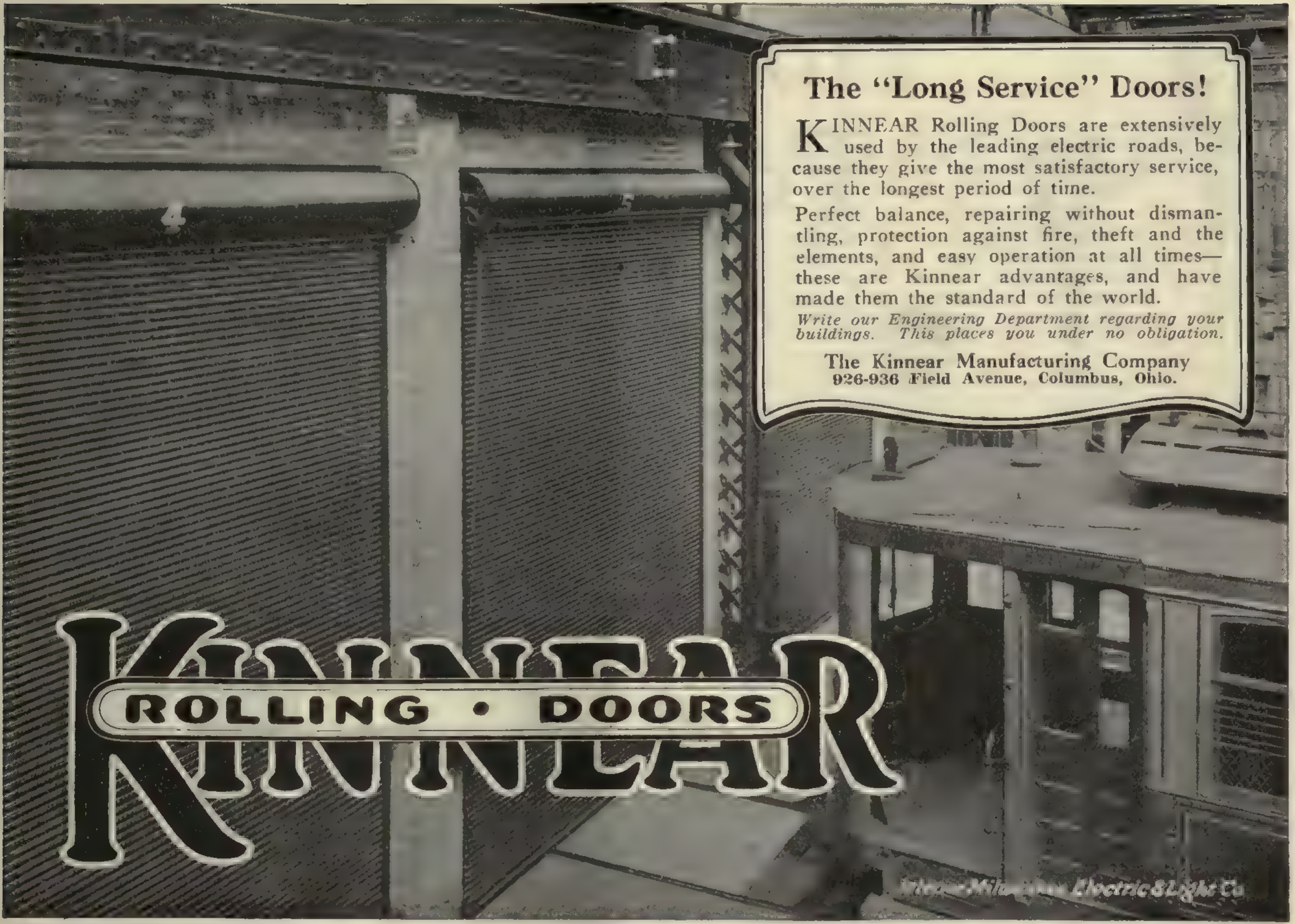

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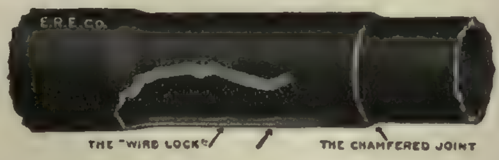

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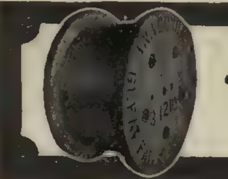

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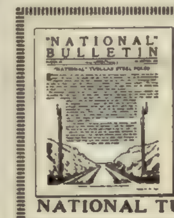

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IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

**New York Switch & Crossing Co.**
Hoboken, N. J.

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# SPECIAL TRACKWORK

Of the well-known **WHARTON** Superior Designs *and* Constructions

| STEEL CASTINGS | FORGINGS | GAS CYLINDERS |
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| CONVERTER AND ELECTRIC | DROP, HAMMER AND PRESS | SEAMLESS STEEL |

**WM. WHARTON JR. & CO., Inc., Easton, Pa.**
(Subsidiary of Taylor-Wharton Iron & Steel Co., High Bridge, N. J.)

ORIGINATORS OF
**MANGANESE STEEL IN TRACKWORK**

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## U. S. Electric Contact Signals

for

- Single-track block-signal protection
- Double-track spacing and clearance signals
- Protection at intersections with wyes
- Proceed signals in street reconstruction work

**United States Electric Signal Co.**
West Newton, Mass.

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# COPPER CLAD STEEL COMPANY

OFFICE AND WORKS.
RANKIN, PA. BRADDOCK P. O.

WESTERN SALES REPRESENTATIVES:
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**COPPERWELD Wire**—*made by the Molten Welding Process*
**Bare—Weatherproof—Strand.**

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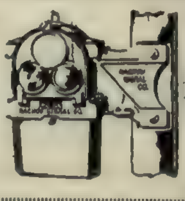

***for* Electric Railways**
**Highway Crossing Bells**
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LOUISVILLE, KY.

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***Rail Bonds and Trolley Line Specialties***

**Flood City Mfg. Co., Johnstown, Pa.**

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205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
Special Work for Street Railways
Frogs, Crossings, Switches and Mates
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ESTIMATES PROMPTLY FURNISHED

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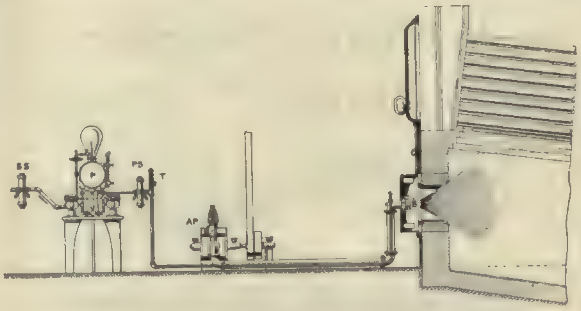
ECONOMICAL
EFFICIENT
RAIL BONDS
THE ELECTRIC RAILWAY IMPROVEMENT CO.
CLEVELAND, OHIO



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FUEL OIL BURNING SYSTEM

Over 1,000,000 h.p. equipped with this system, which is superior to the air or steam atomizing system in regard to economy.

*Ask for Catalog 6-O.*

SCHUTTE & KOERTING CO.
1155 Thompson Street
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THE BABCOCK & WILCOX COMPANY STEAM

IN 1898
STEAM SUPERHEATERS
Were introduced commercially in the United States by this Company. Owners of boilers it has built—Babcock & Wilcox, Stirling and Rust—not now equipped with these coal-saving accessories can obtain information about superheating possibilities from the nearest office listed below.

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85 LIBERTY STREET, NEW YORK

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PHILADELPHIA, North American Bldg.
PITTSBURGH, Farmers Deposit Bank Bldg.
CLEVELAND, Guardian Bldg.
CHICAGO, Marquette Building
CINCINNATI, Traction Bldg.
ATLANTA, Candler Bldg.
TUCSON, ARIZ., 21 So. Stone Avenue
NEW ORLEANS, 533 Baronne Street
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Bldg.
HONOLULU, H. I., Castle & Cooke Bldg.
SAN FRANCISCO, Sheldon Bldg.
LOS ANGELES, 404-406 Central Bldg.
SEATTLE, L. C. Smith Bldg.
HAVANA, CUBA, Calle de Aguiar 104
HOUSTON, TEXAS, Southern Pacific Bldg.
SAN JUAN, PORTO RICO, Royal Bank Bldg.

*SPECIFY*
THE TERRY TURBINE
For Driving Your Auxiliaries
TERRY STEAM TURBINE CO.
Hartford, Conn

WE-FU-GO AND SCAIFE
WATER PURIFICATION SYSTEMS SOFTENING & FILTRATION FOR BOILER FEED AND ALL INDUSTRIAL USES
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A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits
Power Specialty Company Boston Chicago Philadelphia San Francisco Pittsburgh London, Eng. 111 Broadway, New York

Williams' Superior Drop-Forged Wrenches

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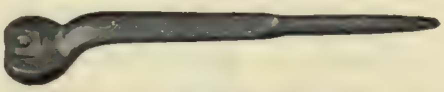
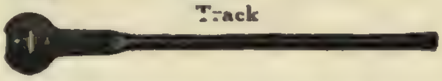
Construction

"Railroad Special"

Structural



Track



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NILES-BEMENT-POND CO.

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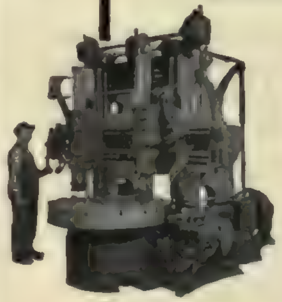

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FOR ELECTRIC RAILWAYS

Axle Lathes
Wheel Presses
Car Wheel Lathes
Boring Mills
Lathes
Hammers
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General Machine Tools

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

I. T. E.

Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

HIGH SPEED MONEY CHANGERS

The new 1921 model —without rivets— ready for delivery

Supplied in one or four tube combinations

Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Traction Companies because conductors demand them. Prices and literature sent on request.

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Exclusive Manufacturers' Selling Agent

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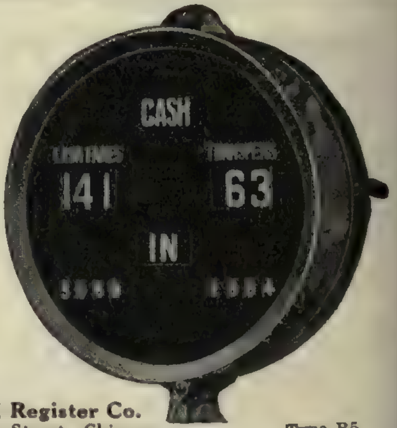
International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings. Exclusive selling agents for HEEREN ENAMEL CAP AND COAT BADGES.



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Type R5

BUCKEYE JACKS

high-grade R. R. Track and Car Jacks.

The Buckeye Jack Mfg. Co.
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FORD TRIBLOC

A Chain Hoist that excels in every feature. It has Planetary Gears, Steel Parts, 3½ to 1 factor of Safety. It's the only Block that carries a five-year guarantee.

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The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

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Branch Offices:
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Pittsburgh Office, 301 Fifth Ave. San Francisco Office, 525 Market St.
Los Angeles Office, 411 S. Main St.
Canadian Office, 1710 Royal Bank Bldg.,
Cor. King and Yonge Sts.
Toronto, Ont.,

HACKSAW
HIGH SPEED
GLADIUM
ECONOMY
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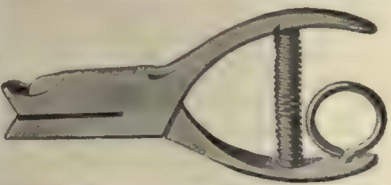
BLADES
GLADIUM CO. Inc. 34 Cliff St. New York

**The Kalamazoo Trolley Wheels**

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

**THE STAR BRASS WORKS**
**KALAMAZOO, MICH., U. S. A.**

Use them in your terminals—
**PEREY TURNSTILES or PASSIMETERS**
*Faster than the ticket seller*
**Perey Manufacturing Co., Inc.**
30 Church Street, New York City



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in the
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**BONNEY-VEHSLAGE TOOL CO.**
Newark, N. J.

**Heating and Ventilating**

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

**The Cooper Heater Company**
Carlisle, Pa.

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Address All Communications to
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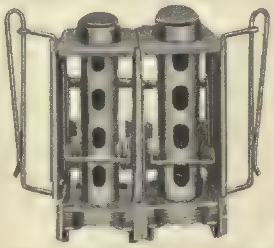
Hand Brakes—Air Purifiers for Compressors—Lighting Fixtures—Electric Vibrating Bells—Thermostats—Switches, Receptacles and Plugs—Junction Boxes, Portables and Reflectors.

**Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.**

**CONSOLIDATED CAR HEATING CO.**
ALBANY, NEW YORK, CHICAGO

**JOHNSON Universal Changer**



**Adjustable**

The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

**Flexible**

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

**JOHNSON FARE BOX COMPANY**
Ravenswood, Chicago, Ill.

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**National Railway Appliance Co.**
**50 East 42nd St., New York City**

Hegeman-Castle Corporation
343 So. Dearborn St., Chicago, Ill.

National Railway Appliance Co.
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**RAILWAY SUPPLIES**

Tool Steel Gears and Pinions
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Genesco Paint Oils
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Feasible Drop Brake Staffs
Flaxlinum Insulation
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Drew Line Material and Railway Specialties
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National Safety Car Equipment Co's One-Man Safety Cars

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**Car Heating and Ventilation**

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

**The Peter Smith Heater Company**
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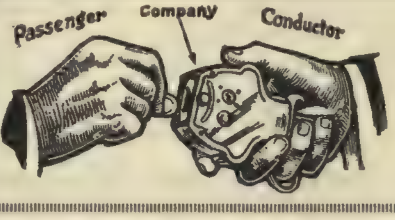
**Car Seating, Broom and Snow Sweeper Rattan, Mouldings, etc.**

**AMERICAN RATTAN & REED MFG. CO.**
Brooklyn, N. Y.
AMERICAN MEANS QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION



**Direct Automatic Registration**
By the
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**Rooke Automatic Register Co.**
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Cleveland Fare Boxes always Fit the Fare and Fare Collection System

**The Cleveland Fare Box Company**
CLEVELAND, OHIO
Canadian Cleveland Fare Box Co, Ltd., Preston, Ontario

ELECTRIC RAILWAY JOURNAL

# Think "SEARCHLIGHT" First

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**POSITIONS VACANT**—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

**POSITIONS WANTED**—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

**ADD 5 WORDS** for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

**DISCOUNT OF 10%** if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

**ADS IN DISPLAY TYPE**—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

**RATE PER INCH** for ads in display space:

| | |
|---|---|
| 1 to 3 in., $4.50 an in. | 15 to 29 in., $3.90 an in. |
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| 8 to 14 in., $4.10 an in. | 50 to 99 in., $3.70 an in. |

POSITIONS VACANT

# EMPLOYMENT

POSITIONS WANTED

## POSITIONS VACANT

EXPERIENCED car barn foreman wanted for car barn operating 225 cars, on property in Middle West. State age, experience and salary expected. P-919, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

## POSITIONS WANTED

CAPABLE master mechanic of proven executive ability, now employed, seeks opportunity to make change, where initiative and dependability are required; 20 years' experience in electric railway field, thoroughly competent in the construction, rebuilding, maintenance and operation of city and interurban cars. PW-918, Elec. Ry. Journal, Old Colony Bldg., Chicago.

FOREMAN—14 years' experience in car construction and repairing. Can handle men and cut your upkeep cost. PW-914, Elec. Ry. Journal, Old Colony Bldg., Chicago.

PRACTICAL trackman of nearly 3[illegible] years experience desires change and position as superintendent of tracks or roadmaster. Can handle any track proposition; seven years in one of largest cities in United States; very best references. PW-917, Elec. Ry. Journal.

TRAFFIC manager or assistant superintendent by young man with 11 years' experience as trainman, inspector, schedule and chief clerk; successful in dealing with employees. PW-903, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

VALUATION engineer, experienced in valuation of electric railways, electric light and power properties. Also experienced in management, construction and maintenance of electric railway properties. PW-896, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

For 20 Years
we have been
Buying and Selling
**Second-Hand Cars**
Trucks and Motors
At Your Service
**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

## To Corporation Managers

If you feel that you are not getting accurate cost figures, or that your statements or system of accounting need revision, the management of this paper can put you in touch with a man capable of giving you the desired results. Further than that, he can furnish men, who have worked under him, to carry on after he has built up the system. He has the best of references from many well known concerns where he has had varied experience in cost work.

FOR SALE
**Interurban Car**
**Substation Equipment**
BEECH GROVE TRACTION CO.
755 Century Building,
Indianapolis, Indiana

You can get
## A Production Checker
at little cost

Here is an opportunity to get a *Productograph* to keep count and make curve chart record on one to twenty producing machines. From these records you know exactly the production you are actually getting from your machines. No guessing. It is in first class condition and various spare parts are included.

**Bargain price for quick sale.**

W. A. Hefner, care of McGraw-Hill Co., 10th Ave. at 36th St., New York City

FOR SALE—One second-hand
## BUCKEYE ENGINE AND GENERATOR

in good condition, description as follows:

DYNAMO—300 kw.; Mfg. Special 18527; Fields 16; Full Load; Mfg. No. 44813 Armature; Speed 143; Volts 550; Amperes 545; 8 Poles; Winding—Compound; Commutator—Good condition; Brushes—carbon; Type Armature Winding—Form.

ENGINE—Mfg., Buckeye; Horiz. Engine; Mfg. No. 5306½; Generator on right; crank on left, Tandem; Diam. Cyl.—12 H 20-L; Stroke 32 in.; Cyl.—not rebored; Shaft Diam.—(in wheel) 14 in.; (in armature) 14; Length—31 ft.; Wheel Diam.—11 ft.; Face 20; Sections 2; Exhaust 12 in.; Floor Space—16½ x 31 ft. 3 in.; Diam. Steam 6 in.; Weight—not known.

**The Beaver Valley Traction Co.**
New Brighton, Pa.

SEARCHLIGHT
SERVICE
SECURES
SATISFACTORY
SALES

2004

# IN STOCK
*for Immediate Shipment*

**Turbo Units, Rotary Converters, Transformers, Motor Generator Sets, Dynamos and Motors**

**ARCHER & BALDWIN, Inc.**
114-118 Liberty St., New York City
Telephone 4337-8 Rector

A
"Searchlight"
Ad
Costs Little
and is
Quick Acting

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20% **NEW REPAIR PARTS** 20%

G-E—67—58—57—52—1000

20% OFF CURRENT PRICES

G-E 1200-800, W-12A—SRG, WP30-50

20% OVER JUNK VALUE

**Rewound Armatures and Fields for Above Motors**
**K, K-2, K-10, K-11, K-12, K14, K6, Controllers and Repair Parts**

***Send Us Your Inquiries***

RECLAMATION DEPARTMENT

20% EASTERN MASSACHUSETTS ST. RY. CO. 20%
1 Beacon Street, Boston, Mass.

*The advertisements in the*
SEARCHLIGHT SECTION
*of this paper*

constitute the most comprehensive group of "live" opportunities to be found in any publication serving this industry.

Each announcement represents a current Want of a concern or individual in the industry with some element of profit in each for whoever can fulfill the need. Some have money saving possibilities, others are opportunities for more business; many are employment opportunities while still others offer chances to buy going businesses, plants, property, etc.

"Searchlight" advertisements are constantly changing. New opportunities find their way into this great Want medium each issue. Regular consultation of the "Searchlight" pages should be as important to the careful reader as reading editorial articles of his particular liking. One is news of the industry, the other, the NEWS OF OPPORTUNITIES being offered in the industry. No one can afford to overlook opportunities.

***For Every Business Want***
*"Think* SEARCHLIGHT *First"*

0140

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Circuit Breakers**
Condit Electrical Mfg. Co.

**Anchors, Guy**
Crouse-Hinds Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Automobiles and Buses**
Brill Co., The J. G.

**Axles**
Bemis Car Truck Co.
Cambria Steel Co.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Babbitt Metal**
Ajax Metal Co.
More-Jones Brass & Metal Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Bearings and Bearing Metals**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bearings, Oilless, Graphite, Bronze and Wood**
Bound Brook Oil-less Bearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
Cambria Steel Co.
Midvale Steel & Ordnance Co.
National Tube Co.

**Bond Testers**
American Steel & Wire Co.
Rail Welding & Bonding Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

**Bonds, Rail**
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

**Brooms, Track, Steel or Rattan**
American Rattan & Reed Mfg. Co.
Zelnicker, W. A., Supply Co., Inc.

**Brushes, Carbon**
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

**Bunkers, Coal**
American Bridge Co.

**Buses, Motor**
Trackless Transportation Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.

**Bushings, Graphite and Wooden**
Bound Brook Oil-less Bearing Co.

**Cables (See Wires and Cables)**

**Carbon Brushes (See Brushes, Carbon)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
Differential Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
McGuire & Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
General Electric Co.

**Castings, Brass, Composition or Copper**
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Ceiling, Car**
Pantasote Co.

**Change Carriers**
Galef, J. L.

**Circuit Breakers**
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coin-Counting Machines**
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Traction Brake Co.

**Concrete Reinforcing Bars**
Cambria Steel Co
Midvale Steel & Ordnance Co.

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

**Conduit Fittings**
Chicago Fuse Mfg. Co.
Crouse-Hinds Co.

**Connectors, Solderless**
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**
Russell Mfg. Co.

**Controllers or Parts**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Electric Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Allison & Co., J. E.

**Conveying and Hoisting Machinery**
American Bridge Co.
Columbia M. W. & M. I. Co.

**Copper Wire**
Anaconda Copper Mining Co.
Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Traction Brake Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Cross Arms (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals (See Signals, Crossing)**

**Crossings, Frog and Switch**
Wharton, Jr., & Co., Wm.

**Crossings, Track (See Track, Special Work)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
Pantasote Co.
St. Louis Car Co.

**Cutouts**
Chicago Fuse Mfg. Co.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Works
Electric Equipment Co.
Foster Co., H. M.
Hyman Michaels Co.
Karasik, Friedman & Co., Inc.
Reading Engineering Co.
Transit Equipt. Co.

**Derailing Devices (See also Track Work)**
Wharton Jr., & Co., Wm.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Doors and Shutters, Fireproof**
Kinnear Mfg. Co.

**Doors, Steel Rolling**
Kinnear Mfg. Co.

**Draft Rigging (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

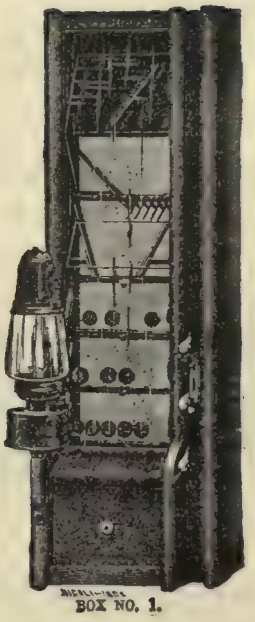
**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

**Electrically Operated Switches (Air or Oil)**
Condit Electrical Mfg. Co.

**Electrical Wires and Cables**
American Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Horton, Barker & Wheeler
Jackson, Walter
Parsons, Klapp, Brinkerhoff & Douglas
Republic Engineers, Inc.
Richey, Albert S.
Sanderson & Porter
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J. G.

**Engines, Gas, Oil or Steam**
Allis-Chalmers Mfg. Co
Westinghouse Elec. & Mfg. Co



*Thirty-two years ago—One of the exhibits in the 1889 Convention Issue.*

THE progress of an industry is inseparably linked up with the progressiveness of the manufacturers of the equipment, materials and supplies without which the industry's work could not be done. In the electric railway industry, the co-operation between operating men and manufacturers has always been hearty.

Operating men realize that their own best interests were in perfect harmony with those of the manufacturers. It is characteristic of the modern electric railway man to be ever on the alert for new or improved equipment, materials or supplies.

As a result, the Exhibit has always been a strong feature of the annual convention of the American Electric Railway Association and in the exhibit section of the Electric Railway Journal's annual convention issue. The exhibit at the convention and the exhibit in the Journal shared the attention of the electric railway industry.

THIS year there will be no exhibit at the convention and the entire industry will depend on the Electric Railway Journal to provide an adequate convention exhibit in its advertising pages.

The opportunity and the responsibility are both welcomed. With the co-operation of the industry's most progressive manufacturers Electric Railway Journal has in preparation a Convention Exhibit that will more than uphold a generation-old record of service. It will be dated September 24.

Electric Railway Journal, Tenth Avenue at 36th Street, New York

# WHAT AND WHERE TO BUY

**Fare Boxes**
- Cleveland Fare Box Co.
- Economy Electric Devices Co.
- Johnson Fare Box Co.
- National Railway Appliance Co.

**Feed Water Heating**
- Schutte & Koerting Co.

**Fence**
- Cambria Steel Co
- Midvale Steel & Ordnance Co.

**Fences, Woven Wire and Fence Posts**
- American Steel & Wire Co.

**Fenders and Wheel Guards**
- Brill Co., The J. G.
- Cleveland Fare Box Co.
- Consolidated Car Fender Co.
- Electric Service Supplies Co.

**Fibre and Fibre Tubing**
- Continental Fibre Co.
- Westinghouse Elec. & Mfg. Co.

**Field Coils (See Coils)**

**Filters, Water**
- Scaife & Sons Co., Wm. B.

**Floodlights**
- Crouse-Hinds Co.
- Electric Service Supplies Co.

**Flooring Composition**
- American Mason Safety Tread Co.

**Floor Plates**
- American Abrasive Metals Co.

**Forgings**
- Cambria Steel Co.
- Carnegie Steel Co.
- Columbia M. W. & M. I. Co.
- Midvale Steel & Ordnance Co.
- Standard Steel Works Co.
- Williams & Co., J. H.

**Frogs, Track (See Track Work)**

**Funnel Castings**
- Wharton, Jr., & Co., Wm.

**Fuses and Fuse Boxes**
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.
- Williams & Co., J. H.

**Fuses, Refillable**
- Chicago Fuse Mfg. Co.
- Columbia M. W. & M. I. Co.
- General Electric Co.

**Gages, Oil and Water**
- Ohio Brass Co.

**Gaskets**
- Power Specialty Co.
- Westinghouse Traction Brake Co.

**Gas-Electric Cars**
- General Electric Co.

**Gas Producers**
- Westinghouse Elec. & Mfg. Co.

**Gates, Car**
- Brill Co., The J. G.

**Gear Blanks**
- Cambria Steel Co.
- Carnegie Steel Co.
- Midvale Steel & Ordnance Co.
- Standard Steel Works Co.

**Gear Cases**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
- Bemis Car Truck Co
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- General Electric Co.
- National Railway Appliance Co.
- Nuttall Co., R. D.
- Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric**
- General Electric Co.

**Generators**
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Gongs (See Bells and Gongs)**

**Grates, Chain**
- Green Eng. Co.

**Greases (See Lubricants)**

**Grinders and Grinding Supplies**
- Metal & Thermit Corp.
- Railway Track-work Co.

**Grinding Blocks and Wheels**
- Railway Track-work Co.

**Guards, Cattle**
- American Bridge Co.

**Guards, Trolley**
- Electric Service Supplies Co.
- Ohio Brass Co.

**Hacksaws**
- Gladium Co., Inc.

**Harps, Trolley**
- Anderson Mfg. Co., A. & J. M.
- Bayonet Trolley Harp Co.
- Electric Service Supplies Co.
- More-Jones Brass & Metal Co.
- Nuttall Co., R. D.
- Star Brass Works

**Headlights**
- Electric Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- St. Louis Car Co.

**Headlining**
- Haskelite Mfg. Co.
- Pantasote Co.

**Heaters, Car (Electric)**
- Consolidated Car Heating Co.
- Economy Electric Devices Co.
- Gold Car Heating & Lighting Co.
- National Ry. Appliance Co.
- Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
- Cooper Heater Co.
- Smith Heater Co., Peter

**Heaters, Car (Stove)**
- Electric Service Supplies Co.
- Smith Heater Co., Peter

**Hoists and Lifts**
- Columbia M. W. & M. I. Co.
- Ford-Chain Block Co.
- Niles-Bement-Pond Co.

**Hose, Bridges**
- Ohio Brass Co.

**Hydraulic Machinery**
- Allis-Chalmers Mfg. Co.
- Niles-Bement-Pond Co.

**Hydrogrounds**
- Horne Mfg. Co.

**Injectors**
- Schutte & Koerting Co.

**Inspection**
- Electrical Testing Lab's

**Instruments, Measuring, Testing and Recording**
- Economy Electric Devices Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Insulating Cloth, Paper and Tape**
- General Electric Co.
- Johns-Manville, Inc
- Standard Underground Cable Co.
- Westinghouse Elec. & Mfg. Co.

**Insulation (See also Paints)**
- Anderson Mfg. Co., A. & J. M.
- Electric Ry. Equipment Co.
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Insulators (See also Line Material)**
- Anderson Mfg. Co., A. & J. M.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- Flood City Mfg. Co.
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
- Electric Service Supplies Co.
- Hubbard & Co.

**Jacks (See also Cranes, Hoists and Lifts)**
- Buckeye Jack Mfg. Co.
- Columbia M. W. & M. I. Co.

**Joints, Rail**
- Carnegie Steel Co
- Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
- Bemis Car Truck Co.
- Brill Co., The J. G.

**Junction Boxes**
- Standard Underground Cable Co.

**Lamp Guards and Fixtures**
- Anderson Mfg. Co., A. & J. M.
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent (See also Headlights)**
- Anderson Mfg. Co., A. & J. M.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
- Ohio Brass Co.

**Lathe Attachments**
- Williams & Co., J. H.

**Lathes, Car Wheel**
- Niles-Bement-Pond Co.

**Lightning Protection**
- Anderson Mfg. Co., A. & J. M.
- Electric Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

**Line Material (See also Brackets, Insulators, Wires, etc.)**
- Anderson Mfg. Co., A. & J. M.
- Archbold-Brady Co.
- Columbia M. W. & M. I. Co.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- General Electric Co.
- Hubbard & Co.
- More-Jones Brass & Metal Co
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

**Loaders, Wagon, Truck or Car**
- Portable Machinery Co.

**Locking Spring Boxes**
- Wharton, Jr., & Co., Wm.

**Locomotives, Electric**
- General Electric Co.
- McGuire-Cummings Mfg. Co.
- Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
- Galena-Signal Oil Co.

**Lubricants, Oil and Grease**
- Galena-Signal Oil Co.

**Machine Tools**
- Columbia M. W. & M. I. Co.
- Niles-Bement-Pond Co.

**Machine Work**
- Columbia M. W. & M. I. Co.

**Manganese Steel Castings**
- Wharton, Jr. & Co., Wm.

**Manganese Steel Special Track Work**
- Wharton, Jr., & Co., Wm.

**Meters, Car, Watt-Hour**
- Economy Electric Devices Co.

**Meters (See Instruments)**
- Electric Service Suplies Co.

**Money Changers**
- Galef, J. L.

**Motor Buses**
- Trackless Transportation Co.

**Motormen's Seats**
- Brill Co., J. G., The
- Electric Service Supplies Co.
- Wood Co., Chas. N.

**Motors, Electric**
- Allis Chalmers Mfg. Co
- Westinghouse Elec. & Mfg. Co.

**Motors and Generators, Sets**
- General Electric Co.

**Nails**
- Cambria Steel Co
- Midvale Steel & Ordnance Co.

**Nuts and Bolts**
- Allis-Chalmers Mfg. Co.
- Barbour-Stockwell Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- Hubbard & Co.

**Oil Burning Equipment**
- Schutte & Koerting Co.

**Oil Circuit Breakers**
- Condit Electrical Mfg. Co.

**Oils (See Lubricants)**

**Oil Switches**
- Condit Electrical Mfg. Co.

**Omnibuses**
- Trackless Transportation Co.

**Packing**
- Westinghouse Elec. & Mfg. Co.

**Paints and Varnishes for Woodwork**
- National Ry. Appliance Co.

**Panelboards**
- Crouse-Hinds Co.

**Paving Bricks, Filler & Stretcher**
- Nelsonville Brick Co.

**Paving Material**
- American Brake Shoe & Fdry. Co.
- Nelsonville Brick Co.

**Pickups, Trolley Wire**
- Electric Service Supplies Co.
- Ohio Brass Co.

**Pinion Pullers**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- General Electric Co.
- Wood Co., Chas. N.

**Pinions (See Gears)**

**Pins, Case Hardened, Wood and Iron**
- Bemis Car Truck Co.
- Electric Service Supplies Co.
- Ohio Brass Co.
- Westinghouse Traction Brake Co.

**Pipe**
- National Tube Co.

**Pipe Fittings**
- Power Specialty Co.
- Standard Steel Works Co.
- Westinghouse Traction Brake Co.

**Planers (See Machine Tools)**

**Pliers, Insulated**
- Electric Service Supplies Co.

**Pole Reinforcing**
- Hubbard & Co.

**Poles, Metal Street**
- Bates Expanded Steel Truss Co.
- Electric Railway Equipment Co.
- Hubbard & Co.

**Poles, Ties, Post, Piling and Lumber**
- Bennett-Field Cross Tie Co.
- Duncan Lumber Co.
- Page & Hill Co.
- Southern Cypress Mfrs. Assn.

**Poles, Top Switches**
- Condit Electrical Mfg. Co.

**Poles, Trolley**
- Anderson Mfg. Co., A. & J. M.
- Bayonet Trolley Harp Co
- Columbia M. W. & M. I. Co.
- Electric Service Suplies Co.
- National Tube Co.
- Nuttall Co., R. D.

**Poles, Tubular Steel**
- Electric Railway Equipment Co.
- National Tube Co.

**Poles and Ties Treated**
- Bennett-Field Cross Tie Co.
- Duncan Lumber Co.
- Page & Hill Co.

**Power Saving Devices**
- Economy Electric Devices Co.
- National Ry. Appliance Co.

**Pressure Regulators**
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

**Pumps**
- Allis-Chalmers Mfg. Co.
- Schutte & Koerting Co.

**Punches, Ticket**
- Bonney-Vehslage Tool Co.
- International Register Co., The
- Wood Co., Chas. N.

**Purifiers, Feed Water**
- Scaife & Sons Co., Wm. B.

**Rails**
- Cambria Steel Co.
- Carnegie Steel Co.
- Foster Co., L. B.
- Midvale Steel & Ordnance Co.

**Rail Grinders (See Grinders)**

**Rails, Relaying**
- Foster Co., L. B.
- Zelnicker, Walter A., Supply Co. Inc.

**Railway Safety Switches**
- Westinghouse Elec. & Mfg. Co.

**Rail Welding**
- Rail Welding & Bonding Co.

**Rattan**
- American Rattan & Reed Mfg. Co.
- Brill Co., The J. G.
- Electric Service Supplies Co.
- McGuire-Cummings Mfg. Co.
- St. Louis Car Co.

**Registers and Fittings**
- Brill Co., The J. G.
- Electric Service Supplies Co.
- International Register Co., The
- Rooke Automatic Register Co.

**Reinforcement, Concrete**
- American Steel & Wire Co.
- Carnegie Steel Co.

**Relays**
- Condit Electrical Mfg. Co.

**Remote Control Switches**
- Condit Electrical Mfg. Co.

**Repair Shop Appliances (See also Coil Banding and Winding Machines)**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

**Repair Work (See also Coils)**
- Cleveland Armature Works
- Columbia M. W. & M. L. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Replacers, Car**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

**Resistance, Grid**
- Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley (See Catchers and Retrievers, Trolley)**

**Rheostats**
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Rolled Steel Wheels**
- Cambria Steel Co
- Midvale Steel & Ordnance Co.

**Roofing, Car**
- Pantasote Co.

**Roofs**
- Haskelite Mfg. Co.

**Sand Boxes**
- Horne Mfg. Co.

**Sanders, Track**
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- Ohio Brass Co.
- St. Louis Car Co.

**Sash Fixtures, Car**
- Brill Co., The J. G.

**Scrapers, Track (See Cleaners and Scrapers, Track)**

**Seating Materials**
- Brill Co., The J. G.
- Pantasote Co.

# Van Dorn

## Couplers and Draft Gears

**Van Dorn
No. 796 Radial
M. C. B. Coupler
Vertical Pivoting**

***For heaviest interurban service***

Van Dorn No. 796 Vertical Pivoting, Radial M.C.B. Coupler is especially desirable on roads having "Electric Merchandise" or freight service. In this class of service it is often necessary for various cars of different lines to couple with each other and also with steam railroad cars. This, of course, necessitates M.C.B. coupling equipment.

The No. 796 Coupler, illustrated above, is especially suitable for this service as it interchanges with any standard M.C.B. Coupler on both steam and electric railroads.

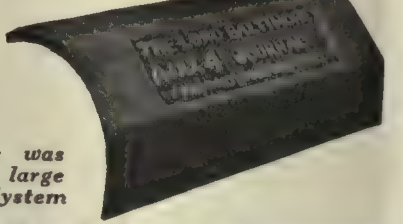
The growing popularity of Van Dorn M.C.B. Couplers is evidenced by the many orders being received from roads contiguous to properties on which Van Dorn equipment has been in service, and by repeat orders from old customers.

The many important features which make the No. 796 extremely desirable for heavy interurban service will be explained to you gladly at your request. We have on hand a good quantity of these equipments for immediate delivery.

**Van Dorn Coupler Company
2325 So. Paulina St., Chicago, Ill.**

**"Reproduction of Ajax Car Brass that ran 336,000 miles before wearing too thin for further use"**

***This Car Brass was sent to us by a large Electric Railway System***



We do not guarantee all our Car Brasses to wear as long—but this Time Record points to why, after thirty years' experience, Ajax Metals stand at the top.
Ajax Car Brasses, Check Plates and Babbitt Metals help to increase your dividends.
They are metals that give good service.

**THE AJAX METAL COMPANY**
***Established 1880***

**Main Office and Works:
PHILADELPHIA, PA.**

**Southern Plant:
BIRMINGHAM, ALA.**

## "Boyerized" Products Reduce Maintenance

Bemis Trucks
Case Hardened Brake Pins
Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

**Bemis Car Truck Co., Springfield, Mass.**

## Bound Brook Trolley Wheel Bushings Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.

***All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.***

**BOUND BROOK OIL-LESS BEARING COMPANY**
Bound Brook, New Jersey *Detroit Office: 1723 Ford Bldg.*

## They are uniform in quality

*They talk for themselves*

**W. J. Jeandron
227 Fulton Street
New York City**

**Pittsburgh Office:
636 Wabash Building**

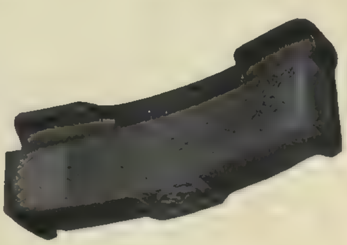
**Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto**

# Brake Shoes

# A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type

**Standard Patterns for SAFETY CAR**



D-67 for Narrow Treads
D-87 for Wide Treads

**American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago Chattanooga, Tenn.**

# WHAT AND WHERE TO BUY

**Seats, Car (See also Rattan)**
American Rattan & Reed Mfg. Co.
Brill Co., The J. G.
St. Louis Car Co.

**Second-Hand Equipment**
Archer & Baldwin
Cleveland Armature Works
Electric Equipment Co.
Foster Co., H. M.
Hyman Michaels Co.
Karasik, Friedman & Co., Inc.
Reading Eng. Co.
Transit Equipt. Co.
Zelnicker, Walter A., Supply Co., Inc.

**Shades, Vestibule**
Brill Co., The J. G.

**Shovels**
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
Hubbard & Co.

**Siganls, Car Starting**
Consolidated Car Heating Co.
Electric Service Suplies Co.
National Pneumatic Co., Inc.

**Signal Systems, Block**
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

**Slack Adjusters (See Brake Adjusters)**

**Slag**
Carnegie Steel Co.

**Sleet Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

**Snow-Plows, Sweepers and Brooms**
American Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.

**Solderless Connectors**
Frankel Connector Co.

**Spikes**
American Steel & Wire Co.

**Splicing Compounds**
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves (See Clamps and Connectors)**

**Spray Nozzles**
Schutte & Koerting Co.

**Springs, Car and Truck**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.

**Sprinklers, Track and Road**
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

**Steel Castings**
Wharton, Jr., & Co., Wm.

**Steel Freight Cars**
Cambria Steel Co
Midvale Steel & Ordnance Co.

**Steps, Car**
American Abrasive Metals Co.
American Mason Safety Tread Co.

**Strand**
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

**Stokers, Mechanical**
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

**Storage Batteries (See Batteries, Storage)**

**Structural Steel**
Cambria Steel Co
Midvale Steel & Ordnance Co.

**Subway Switches**
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Midvale Steel & Ordnance Co.
Roebling's Sons Co., John A.
Standard Underground Cable Co.
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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Ajax Metal Co. 45
Allis-Chalmers Mfg. Co. 31
Allison & Co., J. E. 21
American Abrasive Metals Co. 46
Amer. Brake Shoe & Fdry. Co. 45
American Bridge Co. 21
American Car Co. 51
American Electrical Works 35
American Mason S. T. Co. 48
American Rattan & Reed Mfg. Co. 39
American Steel & Wire Co. 35
Amer. Steel Foundries 48
Anaconda Copper Mining Co. 35
Anderson Mfg. Co., A. & J. M. 35
Archbold-Brady Co. 36
Archer & Baldwin, Inc. 40
Arnold Co., The 20

B

Babcock & Wilcox Co. 37
Barbour-Stockwell Co. 37
Bates Expanded Steel Truss Co. 31
Beeler, John A. 20
Bemis Car Truck Co. 45
Bennett-Field Cross Tie Co. 35
Bonney-Vehslage Tool Co. 39
Bound Brook Oil-less Bearing Co. 45
Brill Co., The J. G. 51
Buckeye Jack Mfg. Co. 38

C

Cambria Steel Co. 24
Cameron Electrical Mfg. Co. 38
Canton Culvert & Silo Co. 36
Carnegie Steel Co. 32
Clark & Co. Mgr. Corp., E. W. 21
Cleveland Fare Box Co. 39
Collier, Inc., Barron G. 16
Columbia M. W. & M. I. Co. 50
Condit Electrical Mfg. Co. 47
Consolidated Car Fender Co. 22
Consolidated Car Heating Co. 39
Continental Fibre Co., The 38
Copper Clad Steel Co. 36
Cooper Heater Co., The 39
Crouse-Hinds Co. 49
Cutter Co. 38

D

Dayton-Mechanical Tie Co. 14-15
Day & Zimmermann, Inc. 21

Page

Differential Steel Car Co., The 48
Duncan Lumber Co. 35

E

Eastern Massachusetts St. Ry. Co. 41
Electric Equipment Co. 40
Electric Ry. Improvement Co. 37
Electric Railway Equipment Co. 35
Electric Service Supplies Co. 11

F

Feustel, Robt. M. 20
Flood City Mfg. Co. 36
Ford, Bacon & Davis 20
Ford Chain Block Co. 38
"For Sale" Ads 40
Fort Pitt Spring & Mfg. Co. 46

G

Galef, J. L. 38
Galena-Signal Oil Co. 17
General Electric Co. 18, Back Cover
Gladium Co., Inc. 38
Gold Car Heating & Ltg. Co. 39
Gould, L. E. 20

H

Haskelite Mfg. Corp. 25
"Help Wanted" Ads 40
Hemphill & Wells 20
Holst, Englehardt W. 20
Horne Mfg. Co. 39
Hubbard & Co. 36

I

International Register Co., The 38
International Steel Tie Co., The 9

J

Jackson, Walter 20
Jeandron, W. J. 45
Johnson Fare Box Co. 39

K

Page

Kinnear Mfg. Co. 33
Kuhlman Car Co. 51

M

McGuire-Cummings Mfg. Co. 26
Metal & Thermit Corp. 8
More-Jones Brass & Metal Co. 29

N

Nachod Signal Co., Inc. 36
National Brake Co. 19
National Pneumatic Co., Inc. 13
National Railway Appliance Co. 39
National Tube Co. 35
Nelsonville Brick Co. 36
New York Switch & Crossing Co. 36
Niles-Bement-Pond Co. 38
Nuttall Co., R. D. 34

O

Ohio Brass Co. 7

P

Page & Hill Co. 23
Pantasote Co. 12
Parsons, Klapp, Brinckerhoff & Douglas 20
Perey Mfg. Co., Inc. 39
Positions Wanted and Vacant 40
Power Specialty Co. 37

R

Railway Track-work Co. 6
Railway Utility Co. 46

Page

Rail Welding & Bonding Co. 10
Ramapo Iron Works 36
Republic Engineers, Inc. 20
Richey, Albert S. 20
Roebling's Sons Co., John A. 35
Rooke Automatic Register Co. 39

S

Safety Car Devices Co. 5
St. Louis Car Co. 34
Samson Cordage Works 46
Sanderson & Porter 20
Scaife & Sons Co., Wm. B. 37
Schutte & Koerting 37
Searchlight Section 40-41
Smith & Co., C. E. 20
Smith Heater Co., Peter 39
Southern Cypress Mfg. Assn. 33
Standard Steel Works Co. 30
Standard Underground Cable Co. 21
Star Brass Works 39
Stone & Webster 20
Stucki Co., A. 48

T

Terry Steam Turbine Co. 39
Tool Steel Gear & Pinion Co. 27
Trackless Transportation Corp. Front Cover

U

U. S. Electric Signal Co. 36

V

Van Dorn Coupler Co. 45

W

"Want" Ads 40
Wason Mfg. Co. 51
Westinghouse Elec. & Mfg. Co. 2
Westinghouse Traction Brake Co. 4
Wharton, Jr., & Co., Wm. 36
White Engineering Corp., The J. G. 20
Williams & Co., J. H. 38
Wish Service, The P. Edw. 21
Wood Co., Chas. N. 35

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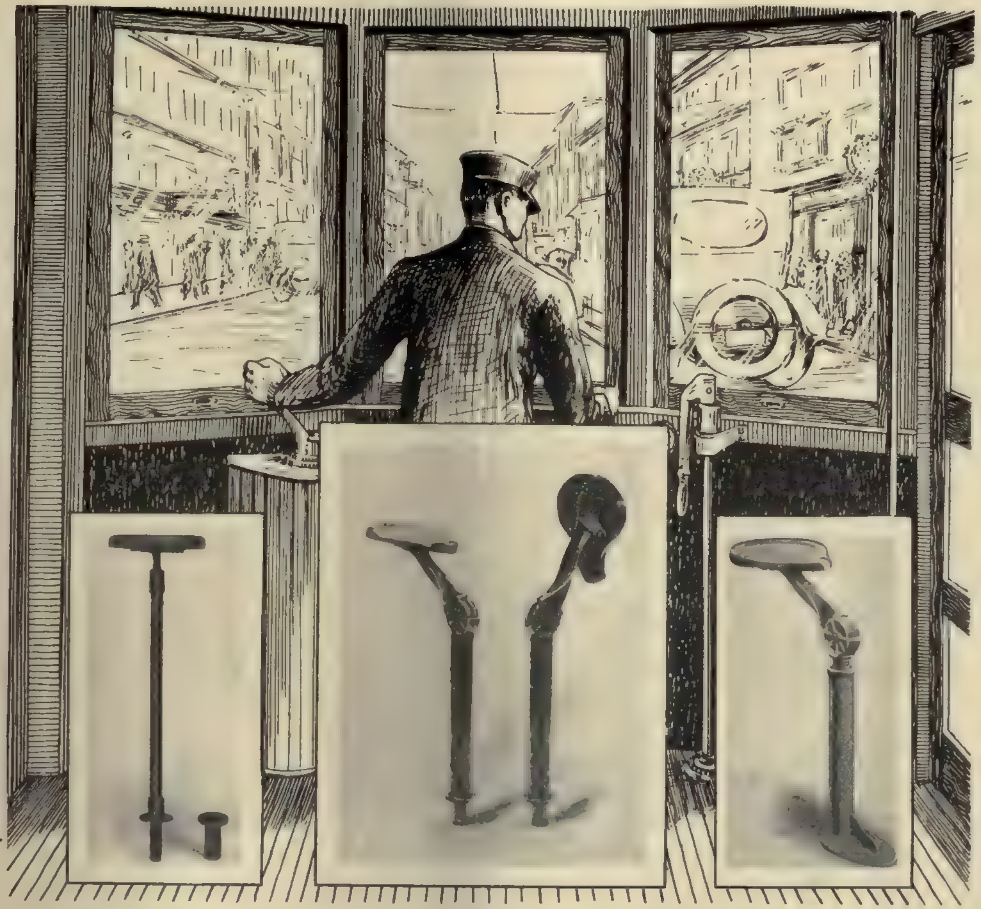

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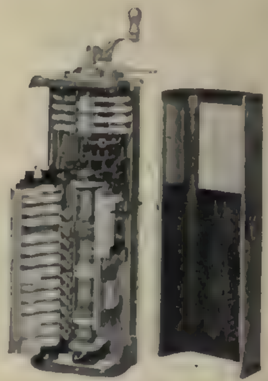

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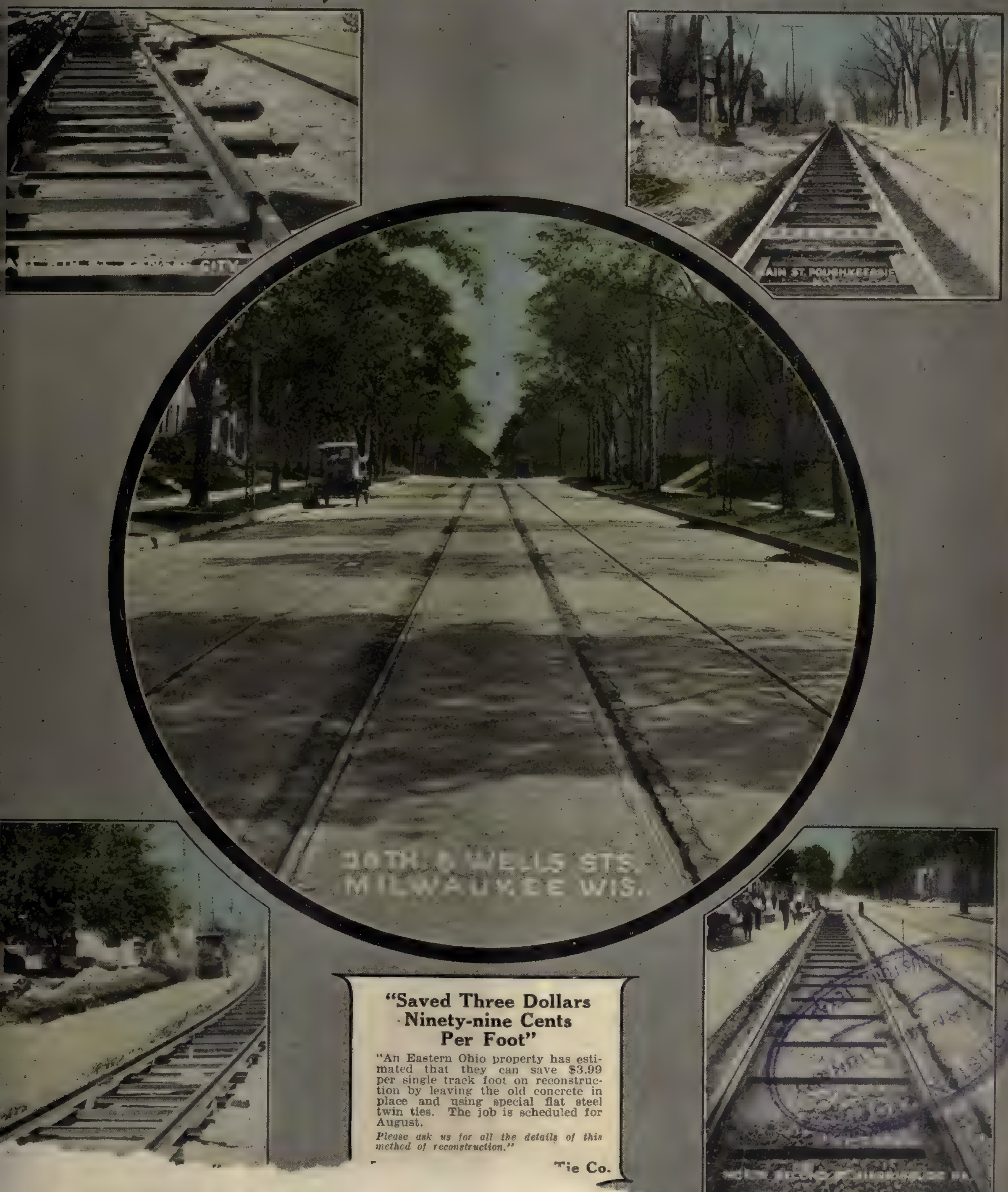

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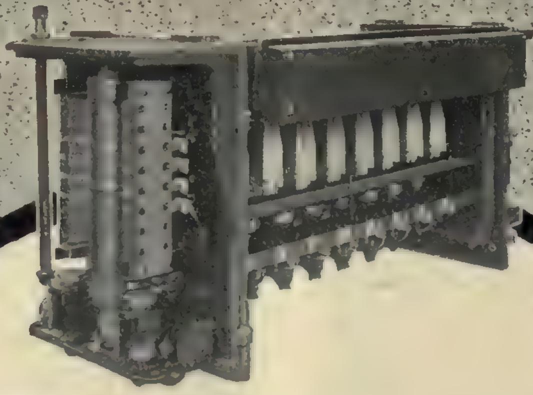

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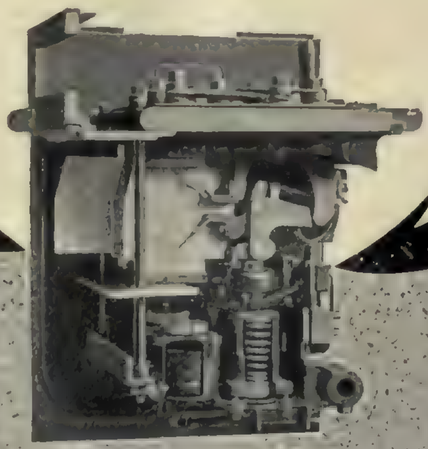

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

# Westinghouse

*Vol. 58, No. 3* New York, July 16, 1921 *Pages* 79-118

# Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

## *Contents*

### Bond Testing Cars Are Convenient and Effective

To test bonds at a faster rate than can be done with hand bond testers, a car containing the necessary instruments is most convenient, says G. H. McKelway. .......... Page 82

### Preparing for Pageant of Progress

Extensive terminal facilities have been built at the municipal pier in Chicago by the Chicago Surface Lines to handle the large crowds which are expected in the period of the festival, from July 30 to Aug. 14. .......... Page 89

### Railway Motor Generators in Winnipeg Are Rebuilt

Three old direct-current generators and two alternators direct connected to Corliss engines, already in the shadow of the scrap heap, are reassembled into two motor-generator sets. W. Nelson Smith tells how additional capacity has been obtained. .......... Page 91

EDITORIALS .......... 79

FACTORS AFFECTING ELECTRIFICATION .......... 84

TORONTO RETAINS ODD GAGE .......... 84

THEY CROWD THEM IN ITALY .......... 90

IMPAIRING AND REPAIRING STREET RAILWAY RATES .......... 94

PUBLIC SERVICE RAILWAY OFFERS VALUATION ARGUMENT .......... 95

LETTER TO THE EDITORS .......... 96

TRACKS REBUILT ON OLD TIES .......... 97

IMPROVING RIDING QUALITIES .......... 97

RECLAMATION DEPARTMENT SHOWS LARGE SAVINGS .......... 98

A UNIVERSAL TIE PLATE .......... 98

SHOP NOTES FROM NEWARK, N. J. .......... 99

REMODELS SINGLE-TRUCK CARS .......... 101

CHATTANOOGA'S SUCCESSFUL CREOSOTE PLANT .......... 101

HARDENING ELLIPTIC SPRINGS .......... 102

MEETING OF AMERICAN SOCIETY FOR TESTING MATERIALS .......... 103

THE MECHANICAL MAN AS A SALESMAN .......... 104

VALUATION AND RATE OF RETURN .......... 104

AMERICAN ASSOCIATION NEWS .......... 105

NEWS OF THE ELECTRIC RAILWAYS .......... 107

FINANCIAL AND CORPORATE .......... 110

TRAFFIC AND TRANSPORTATION .......... 113

PERSONAL MENTION .......... 116

MANUFACTURES AND THE MARKETS .......... 117

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**Power** **Coal Age**

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Elevated and Subway Hot-Weather Crowds

and

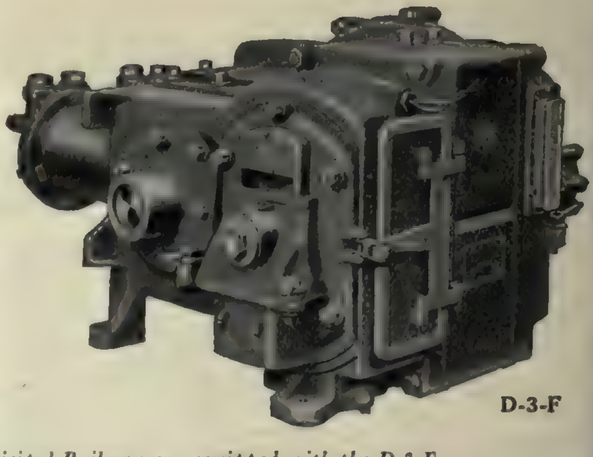
A *New* High-Capacity *Continuous-Service* Compressor That Is Always "Cool"

THE D-3-F Type WESTINGHOUSE COMPRESSOR, with a displacement of 38 cu. ft. per minute and a capacity for *continuous operation* at 100 lbs. pressure without the possibility of a dangerous rise in temperature, is designed for heavy traction service on Elevated and Subway cars where an unusually large and continuous volume of compressed air is required.

The continuous operation feature represents a marked advance in the design of heavy traction compressors and has been accomplished by the use of a motor so ventilated as to preclude prohibitively high temperatures. The compressor proper also embodies an improved system of positive lubrication which permits of more satisfactory operation than could otherwise be expected.

The machine is of simple, rugged construction, requiring only normal attention and insuring maximum service at a low maintenance cost.

The general design incorporates all the desirable features of the other well-known standard Westinghouse Compressors.



D-3-F

*The latest improved-type cars of the New York Municipal Railway are equipped with the D-3-F*

WESTINGHOUSE TRACTION BRAKE CO.

*General Office and Works, Wilmerding, Pa.*

ATLANTA
BOSTON
COLUMBUS, O
HOUSTON, TEX.

CHICAGO
DENVER, COL.
MEXICO CITY
NEW YORK

PITTSBURGH
SAN FRANCISCO
ST. LOUIS, MO.
SEATTLE, WASH.

ST. PAUL, MINN.
LOS ANGELES
SALT LAKE CITY
WASHINGTON

A BUFFER OF SAFETY BEFORE YOUR CARS-

For speed—with safety—at night use
Imperial Luminous Arc Headlights

Even on very low voltage Imperial Luminous Arc Headlights send forth a clear, powerful, safety bringing light. The motorman sees without fatigue. Cross highway traffic is unmistakably warned.

Imperials are rugged, trouble-proof headlights which require a minimum of care.

THE OHIO BRASS CO.
Mansfield, Ohio

New York, Philadelphia
Pittsburgh, Chicago
Los Angeles
San Francisco
Paris, France

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

*Products:* Car Equipment; Trolley Material; Rail Bonds; High Tension Porcelain Insulators; Third Rail Insulators.

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights

# Phono-Electric

## —the only trolley wire on four tracked Canal Street

When a city is busy enough to have a four-track line for more than a mile on its main highway, it is wisdom to build each part of the line as durably and efficiently as possible.

Canal Street, New Orleans, is the most famous thoroughfare of the South, and over every one of its four tracks is that best form of overhead service insurance known as

**Phono-Electric Trolley Wire**

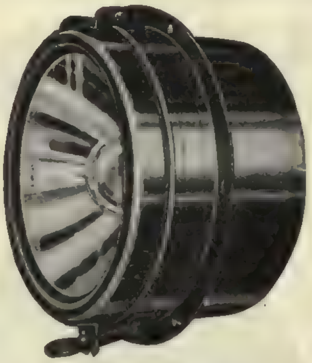
Operators of electric railways over busy highways can afford to use none other than Phono-Electric. For ability to resist wear, blows and arcing it stands alone.

**Bridgeport Brass Company**

**Bridgeport Connecticut**

2234

# The Golden Glow Headlight Reflector

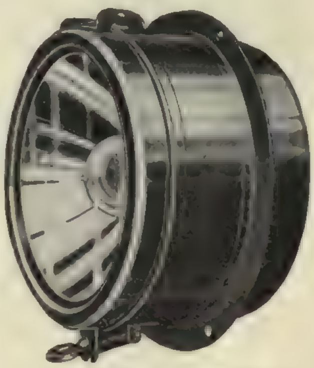


Type RR-96 Golden Glow Headlight

We claim that "Golden Glow" reflectors are not only by far the best, the most efficient and the most permanent reflectors at the present time offered for railway headlight service, but also on account of the specially developed processes and machinery used in their manufacture they are the only accurately made, ground and polished parabolic glass reflectors on the market that can be manufactured and sold at a commercial price.

No headlight is a real headlight unless it has a *real* reflector. The headlight case is simply a container for the reflector.

When you buy headlights—buy the reflectors. Buy Golden Glow Headlights and get the best headlights at a reasonable first cost. Write for catalog sheets.



Type RM-96 Golden Glow Headlight

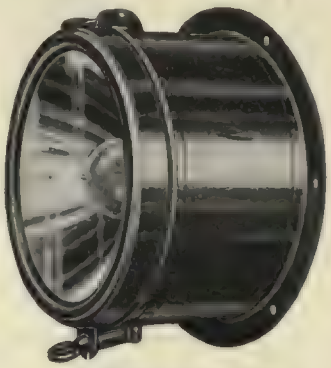
**ELECTRIC SERVICE SUPPLIES CO.**

***Manufacturer of Railway Material and Electrical Supplies***

| PHILADELPHIA | NEW YORK | CHICAGO |
|---|---|---|
| 17th and Cambria Streets | 50 Church Street | Monadnock Bldg. |

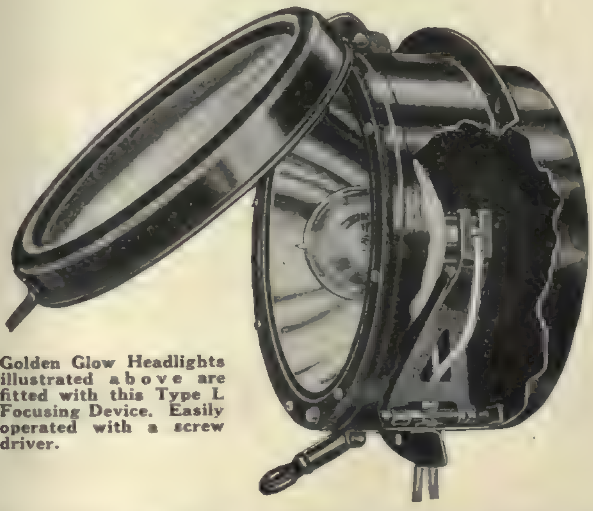
***Branch Offices:*** **Boston, Scranton, Pittsburgh**

***Canadian Distributors:***
**Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver**



Type RE-96 Golden Glow Headlight

Golden Glow Headlights may be fitted with these Keystone Refractory Lenses.



Golden Glow Headlights illustrated above are fitted with this Type L Focusing Device. Easily operated with a screw driver.

# FLOOD CITY

## Trolley Line Specialties

**Their Success in Coal Mines Caused Adoption by Railway Lines.**

**Trolley Wheels**
**Bushings**
**Section Insulators**
**Section Switches**
**"Everlast" Rail Bonds**

Developed under the severe conditions of mining service, where inspection is difficult and infrequent, Flood City trolley line specialties and "Everlast" Rail Bonds offer a superior quality product for electric traction companies. Flood City materials are built to "stand the gaff" and their extra long life cuts maintenance costs and reduces depreciation burdens.

*Let us submit quotations on your next requisition for this class of supplies.*

**Flood City Manufacturing Co.**
**Johnstown, Pa.**

*Modernize!* *Pneumatize!*

# THE PEOPLE OF YESTERDAY ARE NOT THE PEOPLE OF TODAY

Yesterday things were done by hand or foot—today they are done by power.

You would not willingly go back to the oil lamp, the manual broom, the hand or foot sewing machine, the elevatorless building and, to come down to the minute, you surely prefer a self-starter on your automobile to cranking by hand.

The electric light, the vacuum cleaner, the motor-driven sewing machine, the automatic elevator are but a few of the devices that have turned the plodders of yesterday into the speeders of today to save labor and time.

In no other industry is time so important and labor so great an element as in electric railroading; and in no other industry does the consumer of the product come into such intimate touch with the workings of the business.

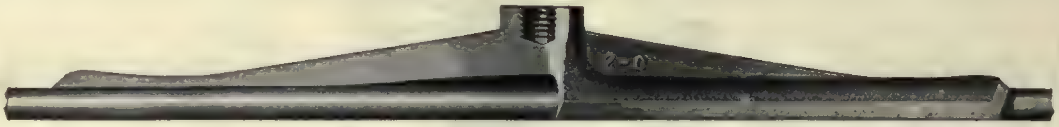
Can you afford, therefore, to continue the operation of any of your cars according to the hand and foot methods of yesterday when your public of today has become accustomed to labor-saving and time-saving appliances everywhere else? There is but one profitable answer to this question: Speed up your cars with the modernizing devices embodied in this famous group.

## National Pneumatic

**Door and Step Control** **Door and Step Operating Mechanisms**
**Motorman's Signal Lights** **Safety Interlocking Door Control**
**Multiple Unit Door Control**

***Manufactured in Canada by***
**Dominion Wheel & Foundries, Ltd.**
**Toronto, Ont.**

National Pneumatic Company, Inc.
50 Church St., New York Edison Bldg., Chicago
Works: Rahway, N. J.

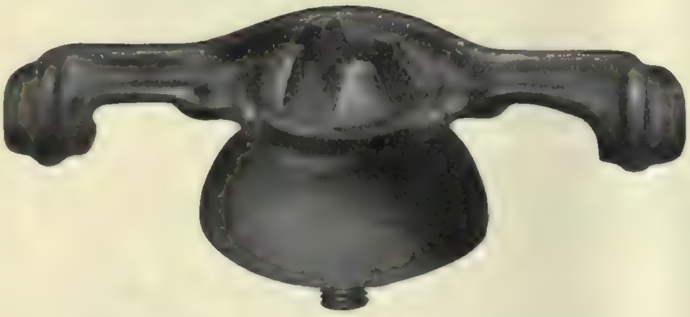


# DREW CUSHION EARS

**The cure for "cupped" wire under hangers**

The groove of this ear is made deeper in the center for a distance of two and a half inches on each side of the boss. This provides a cushion effect by allowing an upward movement of the wire when the trolley wheel passes under the hanger, thus eliminating the dead blow against the weight above. This slight yielding of the wire prevents "cupping" or flattening—prolongs the life of both ear and wire, and eliminates pounding and arcing.

DREW CUSHION EARS, after exhaustive tests, are now standard on many large properties. Send for details today.



# DREW FLOATING BELL HANGER

**Eliminates Loose Ears**

In the simple construction of this floating bell hanger, our Engineers have developed a rugged lock type hanger which stays "put" until the wires come down. The hanger consists of only two pieces. The yoke and the bell are of best quality galvanized malleable iron. The stud bolt, with seat washer is firmly molded into best grade insulation.

To install, screw the ear "home." The shell can then be turned to alignment with any short bar or tool in the top notches, and tension of span through the yoke and around the groove in bell keeps the hanger in line. The center of suspension brings the span wire near the trolley wire, which is a desirable feature. The hanger is light in weight, but is designed to stand all strains.

Ask us to send you complete details today.

# Drew Pole Sleeves

**Treble Service at One-fifth the Cost**

Make your corroded poles permanently safe before the heavy storms of winter cause serious damage and interrupt service. Drew Pole Sleeves strengthen old poles and make them equal in service to new ones. The cost of these pole sleeves is insignificant when compared to the cost of new poles, and they can be installed in approximately thirty minutes' time, without in any way disturbing the overhead connections.

New poles equipped with Drew Pole Sleeves are insured against corrosion at the ground line and will give three times the length of service.

Drew Pole Sleeves are made of the best quality malleable iron, heavily ribbed to give additional strength.

Save 80% on your pole purchases by writing immediately for details.

**DREW products have always been universally recognized because of their superior quality and correctness of design. With our complete and modern manufacturing plant, better equipped and better organized than ever before, we are able to make very prompt if not stock shipments on all orders.**

**The Drew Electric & Mfg. Company, Cleveland, Ohio**

DREW

# Proposing Active Partnership

The advertisement for the popular magazines reproduced here carries the idea of co-operation, between the Public and the Public Utilities, forward another step.

The previous steps have been gradual and now it is proposed that those who have recognized the facts and ceased "heckling" become active partners, and share in the ownership and guidance of the Public Utilities.

They are not asked to take this step in the dark. The future of the Utilities has been outlined. The protection to investment through supervision by the State is noted and the opinions of the experts on investments, the bankers, as reflected by the "quotations" on the financial pages of the daily papers are cited for the investors' guidance.

## The Scotchman's Heaven

IT is the custom, time honored, to approach investment matters in a grave and serious vein, and so reflect the solidity of the securities offered.

But it is the exception that proves the rule, and even in so solid a field as the financial, there are exceptional investments offered.

To those who are Scotch by purse (if not by birth) the securities of the Light and Power companies of America should appeal strongly, offering as they do maximum safety and maximum return, and this is paradoxical only until the reasons are given.

First of all, we haven't as a nation the Public Utility Security buying habit, just as before the war we hadn't the Government Bond buying habit — and habit, imitation, (merit aside) plays a big part in security sales, just as it does in the clothing business.

Wise ones are just beginning to discover that the utility has something to offer in its securities that even from a banking standpoint is about air-tight.

*First*, partnership in a basically necessary service to society—power and light. (Making for vitality of investment.)

*Second*, an industry under public control through State commissions—an insurance of safe management.

*Third*, a potential future market twice as big as the present—securing and assuring future earning power.

It is significant—and any statistical chart proves it—that strikes, inflations and deflations and all the other illnesses to which securities are supposed to be subject, seem to affect the Public Utility least of all.

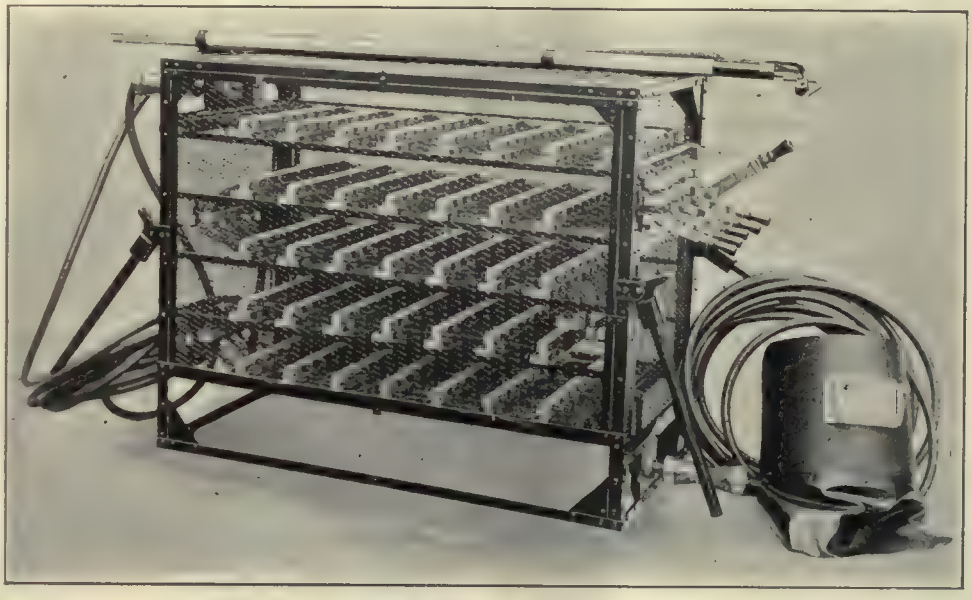
Remember this when you read what they offer the investor—in the percentage column—today.

*Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.*

**Western Electric Company**

**No. 26** *Western Electric is many-sided in its service—in the far-flung distributing economy of 49 branch houses, in the careful selection of products worthy of indorsement, in the specialized knowledge of engineering and sales staffs.*

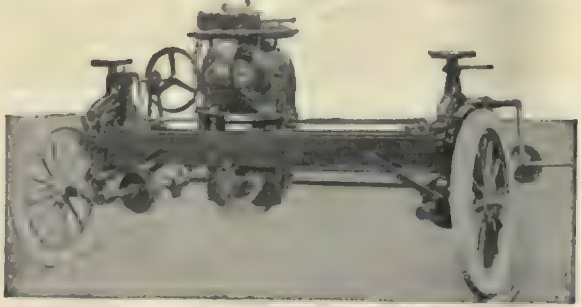
# WARRIORS against WASTE



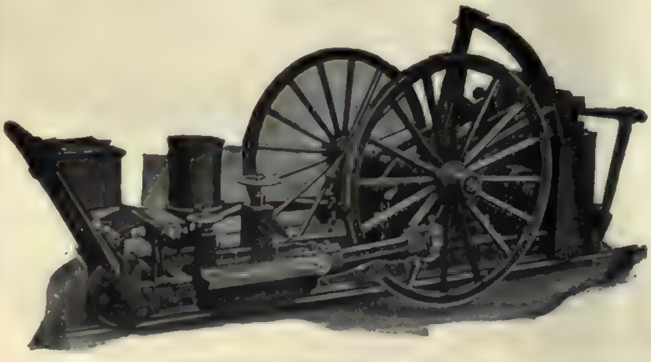
AJAX Electric Arc Welder

**Complete
Track
Salvage
Equipment**

ATLAS Rail Grinder



UNIVERSAL Rotary Track Grinder



RECIPROCATING Track Grinder

## Reduce Bad Track Wastes

*Committee of the American Engineers Council places blame for 50% of industrial waste on employers and only 25% on labor—(Newspaper headline).*

This proportion may not be the same for the electric railway field, but the wastage of power, the costly use of men and materials for car repairs, and the more rapid deterioration of the track itself, all due to failure to properly maintain the track, are certainly not wastages chargeable to labor.

We are prepared to furnish you a complete outfit for the salvaging and improvement of track by means of welding and grinding.

Let us go into the track rehabilitation problem with you.

**Railway Track-work Co.**
**3132-48 East Thompson St.,**
**Philadelphia, Pa.**

# Replacing the Small Bridge with Culverts

A recent letter sent highway officials in many states brought forth some surprising statements relative to the number of small bridges which were installed some years ago and which today are totally inadequate for the heavy loads they are compelled to carry. Over 25,000 small bridges in one state were pronounced unsafe for anything heavier than pleasure vehicles and ordinary wagon loads. Many of the bridge engineers commented on the weakness of small bridges in their states and pointed out the advisability and necessity of replacing floor boards and strengthening stringers to prevent failures and possible serious accidents. The constant maintenance and repair of small bridges takes labor, material, and money which can be diverted to new construction and road maintenance when a better method of bridging small waterways is used.

The illustrations on this page indicate how some highway and bridge officials have successfully replaced the troublesome small bridge. One, two, or more Armco Culverts are placed in the channel and head walls of concrete or rubble are constructed at the ends of the culverts. The space between the head walls is then filled and the regular road surface extended across the fill. No maintenance or repairing is required other than the regular maintenance of the road surface. The permanence of such construction has been amply demonstrated by hundreds of culvert installations which were made ten or more years ago and which are in perfect condition today.

ARMCO
Resists Rust
Ingot Iron

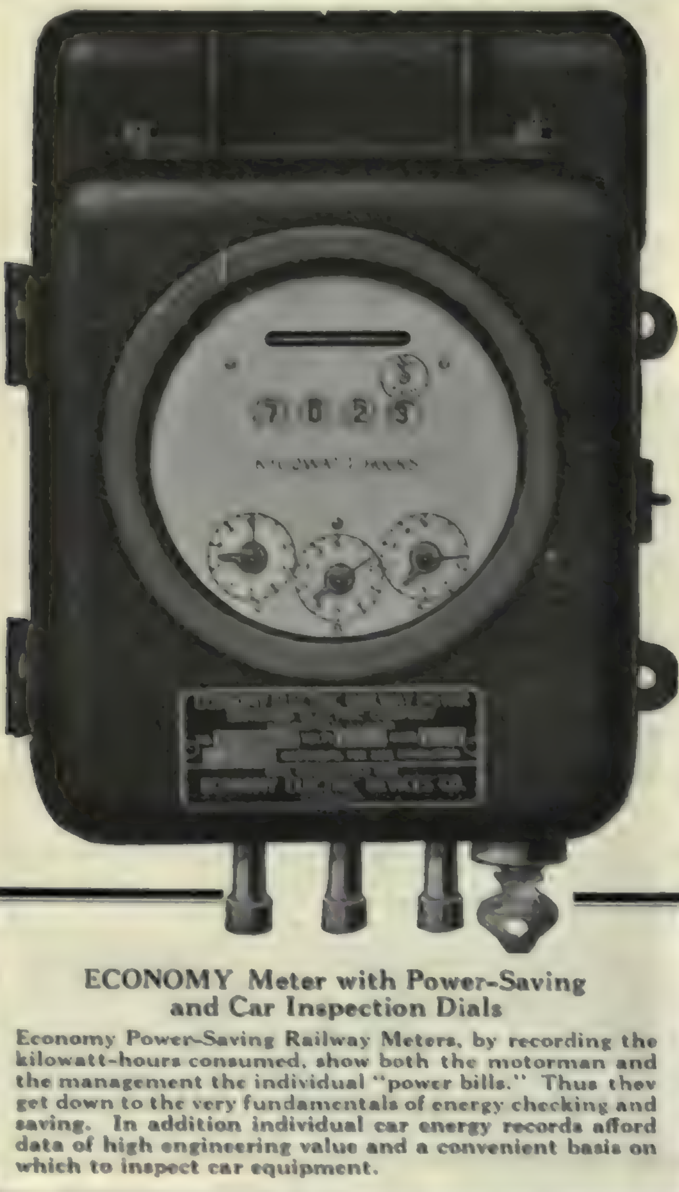
There is a manufacturer in nearly every state, and in Canada, making genuine rust-resisting ARMCO CULVERTS and other products of Armco Ingot Iron such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

**ARMCO CULVERT & FLUME MFRS. ASSN.**
**215 NORTH MICHIGAN AVE. CHICAGO**

# Bay State Orders
# for Economy Meters

## *This Large Property will Double the*

## *An ECONOMY Mete*
## *All inspectio*
## *kilowat*



**ECONOMY Meter with Power-Saving and Car Inspection Dials**

Economy Power-Saving Railway Meters, by recording the kilowatt-hours consumed, show both the motorman and the management the individual "power bills." Thus they get down to the very fundamentals of energy checking and saving. In addition individual car energy records afford data of high engineering value and a convenient basis on which to inspect car equipment.

IN 1918 the Bay State System, now the Eastern Massachusetts Street Railway, installed 1239 ECONOMY Meters. This road has since purchased 40 more ECONOMY Meters for special uses.

The power-saving induced by this large installation paid for the meters during the first year. In addition, the meters proved to the Company the high value of car inspection on a kilowatt-hour basis.

As a result, the Bay State System has just contracted for Inspection Dials for the meters on 700 active cars, which include 251 new Safety cars.

This property also has 100 reserve cars, all of which are equipped with standard dial ECONOMY Power-Saving Meters.

*Thus the Bay State System will operate an ECONOMY Meter on every one of its regular cars and will inspect every car on the kilowatt-hour basis.*

## *ECONOMY METERS on more than 75 Railways*

# Inspection Dials
# On Seven Hundred Cars
## *Usefulness of its Power-Saving Meters*

## *on every Bay State Car*
## *of cars on the*
## *hour basis*

The Bay State System has been in process of rehabilitation and the number of cars operated has been reduced by about 30 per cent.

Of the 800 cars now operated, 251 are new Safety cars, 426 are rebuilt double-truck cars operated on the one-man plan and the balance, 130, are double-truck two-man cars, 100 of which are normally in reserve.

The present Inspection Dial order includes the material necessary to convert standard-dial meters for the 700 active cars into power-saving and car inspection meters of the latest type.

Thus the Bay State System, after three years' experience, confirms the value of ECONOMY Meters, by installing them on 251 new Safety cars and by inspecting these and all other cars on the highly efficient Kilowatt-Hour Basis.

*The Economy Meters installed on the Bay State cars in 1918 were equipped with straight cyclometer type dials for power-saving. During the introduction of these meters, the correctness of principle and high operating value of the meter as a car inspection device were proven to the mechanical and operating departments.*

*From that time on, the meters served a double purpose—power-saving and car inspection. Using the meter to determine the car inspection interval avoided useless inspection and protected against missed inspections. Each car is held in for inspection whenever and only after it has done a full, predetermined and safe amount of work.*

*Car inspection on the kilowatt-hour basis as compared with the mileage or time basis, is safer, cheaper and induces more thorough pit work.*

*The kilowatt-hour basis so substantially reduced the cost of Bay State car inspection as to justify the investment in meters for this use alone, even though the meters had not also clearly shown energy savings as high as ½ kw.-hr. per car mile.*

*HENCE THE PRESENT ORDER.*

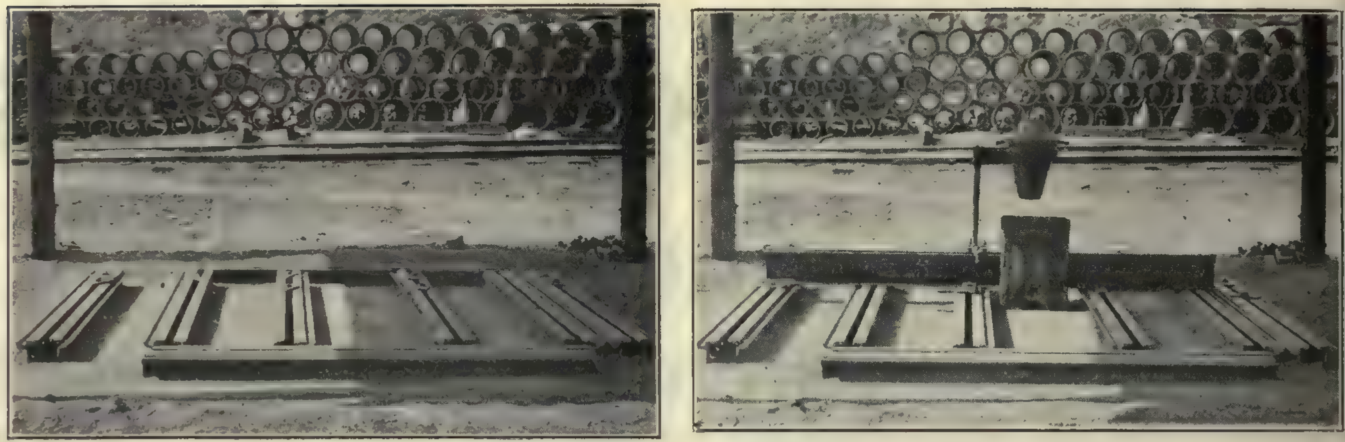
## Economy Electric Devices Company
L. E. GOULD, Pres., Old Colony Bldg, Chicago

Cable Address: Sangamo, Chicago

National Railway Appliance Co., New York
L. A. Nott, San Francisco

Burton R. Stare Co., Seattle
J. G. Monahan, Los Angeles
Alfred Collyer & Co., Montreal, Quebec

Ludwig Hommel & Co., Pittsburgh
Grayson Railway Supply Co., St. Louis



Two views showing Atlanta's Thermit welding platform for constructing frogs.

# Thermit Welded Frogs in Atlanta Give "Entire Satisfaction"

*Electric Railway Journal July 2, 1921*

FOR more than a year now the Georgia Railway & Power Company, Atlanta, Ga., has been building crossovers and frogs by the Thermit process in cases where one or two frogs have gone to pieces in a crossing the rest of which is apparently good for several years. The company reports that there has been uniform satisfaction in this work. Records indicate that, in the case of the welding of frogs, the cost has been about one-third of the cost of a new frog ordered especially to take the place of the one which had given out.

Atlanta is by no means the only spot where these low cost and easily constructed Thermit frogs and crossings are giving perfect satisfaction. Over a score of other cities have installed them. A number of these have been in service over five years, and are still in good condition.

Let us send you a Thermit outfit at once and let our experienced track engineers instruct your men in constructing a Thermit crossing by using simply the rail which you have on hand, your own track labor and the Thermit outfit and materials.

*Send for our latest Rail Welding Pamphlet* 3932.

# METAL & THERMIT CORPORATION

**Boston**
**Pittsburgh**
**Chicago**

**120 Broadway New York**

**Toronto**
**South San Francisco**

# Another Official Endorsement Of Johnson Fare Boxes

---

The following paragraph from a petition filed before the Railroad Commission of the State of California shows what the Los Angeles Railway Corporation thinks of JOHNSON FARE BOXES:

> "Applicant desires an opportunity to show that the increased gross earnings in 1920 of twenty per cent were not due solely to an increase of business, but to a very substantial extent resulted from better methods of collecting fares through the use of fare boxes and the practical elimination of thievery on the part of its employes through the installation of better operating methods."

The cars of the Los Angeles Railway are fully equipped with Johnson Fare Boxes.

We can cite no better evidence of satisfactory performance than the above quoted paragraph.

Recently we quoted a similar endorsement from the receiver of the United Railway Company of St. Louis.

We can refer to hundreds of companies who will certify to the large gain in revenue due to the use of Johnson Fare Boxes.

---

**JOHNSON FARE BOX COMPANY**
**Ravenswood, Chicago, Illinois**

Duracord

For dragging around the greasy pits, under cars and through machinery, Duracord is the electric cable to use for all extension lights and portable tools.

and

DURADUCT

—For Car Wiring

As compared with ordinary metallic conduit used in car wiring, Duraduct will save 85% to 90% in weight, say 300 to 600 lbs. per car depending on the type and size. Why burn coal at the power plant to drag this useless weight around?

Tubular Woven Fabric Co., Pawtucket, R. I.

52 Vanderbilt Ave.
New York, N. Y.

549 W. Washington Blvd.
Chicago, Ill.

# *Why Universal Lubricating Service insures Money Saving*

**"Overall Specialists"**

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

The lubricating service offered by the manufacturers of Tulc is *individual* in every sense of the word.

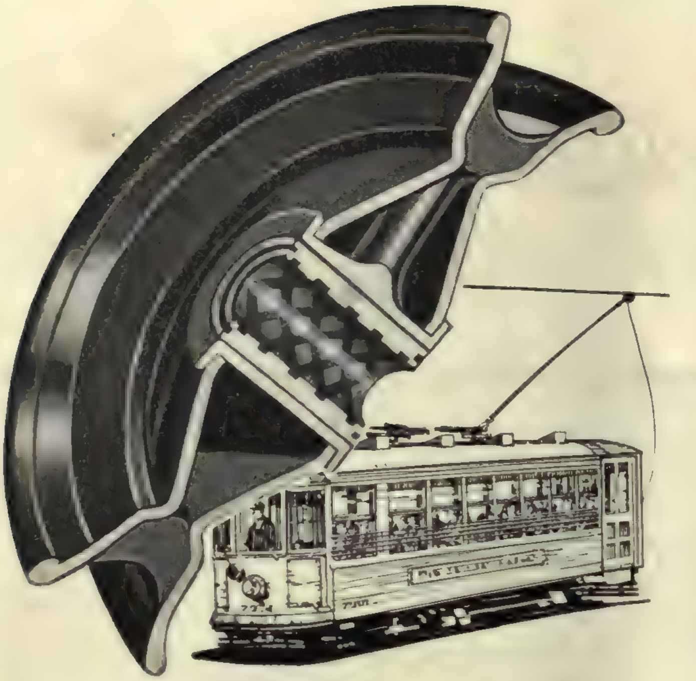
When you are ready to permit us to improve lubricating methods and decrease lubricating costs on your property, our calculations will be based on the requirements of *your individul property*—not upon similar properties or upon what we have done in the past. Our broad experience in this field and the valuable data which we have acquired in solving similar problems for other roads is helpful, of course, but only insofar as it can be applied in a general way. We have no fixed policies that must be rigidly adhered to. Our service is *flexible*. That's why it's *individual* and why you can rely upon it to give maximum results.

*Write for a copy of our Booklet "Results."*
*It contains complete data.*

***The* Universal Lubricating Co.**
**Offices: Schofield Bldg.** **Works: Sweeney Ave.**
**Cleveland, Ohio**

**TULC**
**A**
**LUBRICANT**

**—scientifically and accurately compounded to reduce lubricating costs**



*Bound Brook Oil-less Trolley Wheel Bushings are now used by two thirds of America's electric railway systems.*

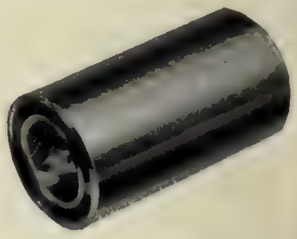
# For Low Cost Maintenance

THE fundamental of trolley wheel maintenance isn't adjustments—nor replacements. It's *lubrication.* That's why Bound Brook Oil-less Bushings are so necessary.

Solidly packed in a lattice grooved core, the specially prepared graphite in this bushing separates the rubbing surfaces with a lubricating cushion—a positive protection against cohesion and excessive wear. Because of this unique construction the wear is slow and gradual thruout—the lubrication in most cases outlasting the wheel itself.

Such smooth functioning reduces wheel vibration, makes perfect transmission possible and reduces burnt shunts and other harp troubles to a minimum.

Give your wheels a chance to show service. Provide against excessive wear by always specifying genuine "Bound Brook" Oil-less Trolley Wheel Bushings.



**Bound Brook Oil-less Bearing Co.**

*Specialists in the manufacture of Oil-less Bushings for more than a third of a century*

**Bound Brook, New Jersey**

Detroit Office: 1723 Ford Bldg.

**BOUND BROOK**

**OIL-LESS TROLLEY WHEEL BUSHINGS**

**DU PONT FABRIKOID**

## Thousands of coaches are now upholstered with Fabrikoid

BECAUSE Fabrikoid is *comfortable*—it is soft, pliant and flexible. Travelers appreciate this upholstery.

Because Fabrikoid is *sanitary*. It is absolutely impervious to dust and dirt. It is not stained by liquids, greases or perspiration. And just soap and water clean it in a jiffy.

Because Fabrikoid *wears*. It outlasts most seat coverings. Perspiration will not rot it. Careless passengers do not harm it—it is scuff-proof. It is built to give service—and it does just that—stands up under the hardest usage.

Fabrikoid upholstery is thoroughly economical. When it is applied, it's on to stay for many years. It is the easiest upholstery to care for and keep up. Let us send you full information and samples of Fabrikoid. It is made in a wide variety of grains and colors. It will pay you to investigate.

**E. I. du Pont de Nemours & Co., Inc.**
***Sales Department:* Fabrikoid Division**
**Wilmington, Delaware**

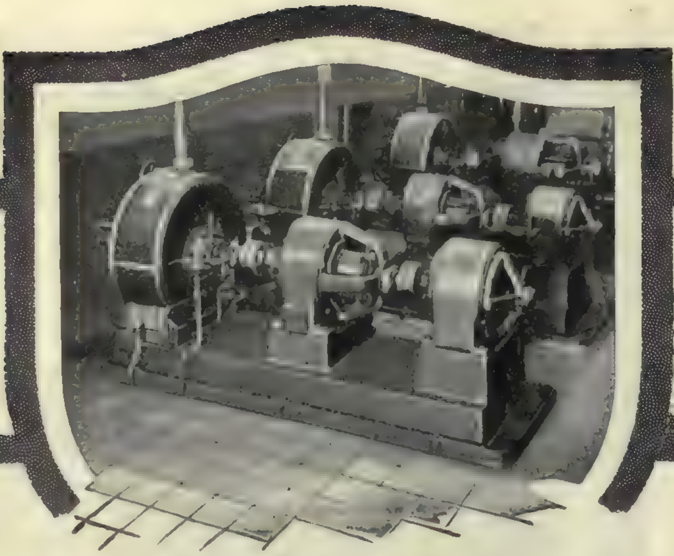
*Branch Offices:*

| | |
|---|---|
| Harvey Building | Boston, Mass. |
| McCormick Building | Chicago, Ill. |
| Gugle Building | Columbus, Ohio |
| Dime Bank Building | Detroit, Mich. |
| Merchants Bank Building | Indianapolis, Ind. |
| 21 East 40th Street | New York City |
| Chronicle Building | San Francisco, Cal. |

*Plant:* Newburgh, N. Y.

*Fabrikoid—the result of a process adding beauty and long life to fabrics; some heavy and rugged, others dainty as linen—all pliable, scuff-proof, stain-proof and water-proof.*

FABRIKOID



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THE three 75 K.W. Duplex Exciter Sets shown above were installed at the United Illuminating Co.'s plant at Bridgeport three years ago. In reporting on the nature of the service obtained it was stated that the units were O.K. in every way. Furthermore, that the operation of these sets has been such that machines of this type will be installed in the new station.

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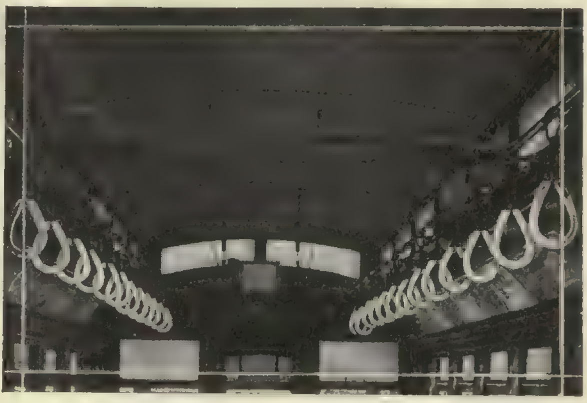

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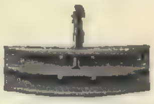

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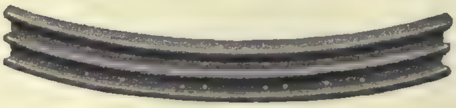

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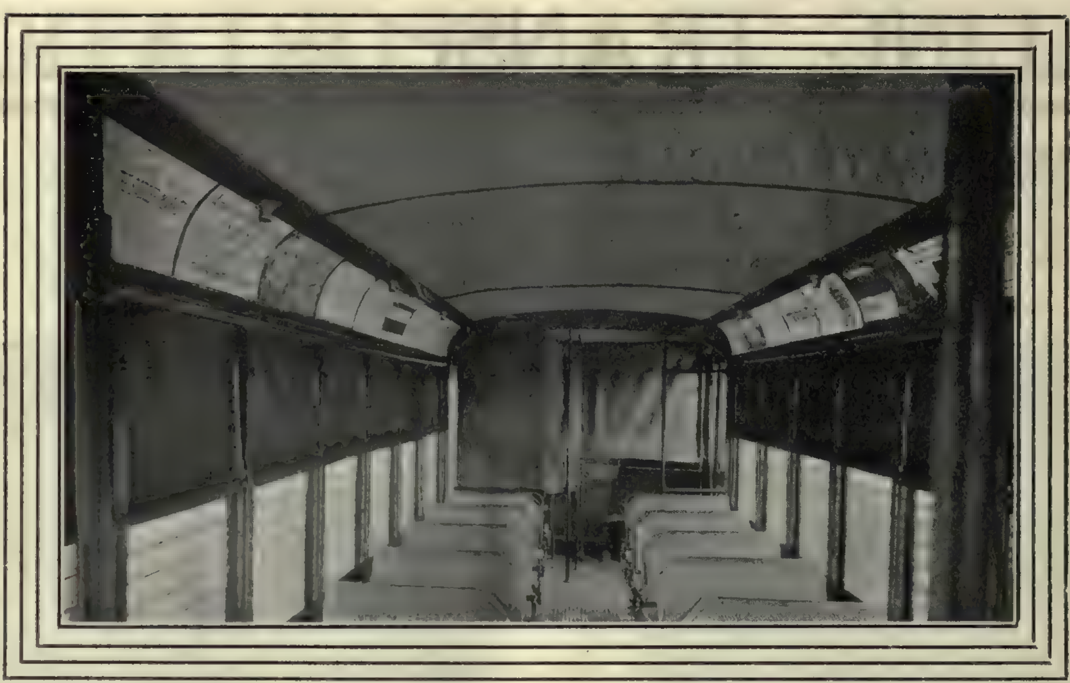

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# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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## A Secretary of Proved Ability

THE association is to be congratulated upon the recommendation which its reorganization committee has made with reference to a permanent secretary to succeed E. B. Burritt, who resigned last March. J. W. Welsh, whom the committee has recommended to the executive committee and who will doubtless be appointed by that committee, already has the confidence of the entire membership of the association and has shown himself amply able to perform the duties which will devolve upon him.

As special engineer to the association, Mr. Welsh already had made his work felt in the association's activities, and when President Gadsden asked him to undertake, quite suddenly it will be remembered, the work of secretary, Mr. Welsh stepped into the breach and, in this rather trying position as acting secretary, has acquitted himself so admirably and has shown so satisfactorily his complete fitness for the permanent secretaryship that he was the only logical candidate out of a multitude of suggestions to be considered for the place.

The ELECTRIC RAILWAY JOURNAL is sure that the association headquarters activities are in good hands and congratulates both Mr. Welsh and the association upon the new relationship, which will probably be arranged at the next meeting of the executive committee.

## Get Work Commensurate with Wages Paid

THE news columns of nearly every recent issue of this paper have recorded wage decreases on electric railways in almost every part of the country, but probably few of them have been equal in percentage to the demonstrated reduction in cost of living which has occurred since the peak of prices in the early part of 1920. Undoubtedly wages on electric railways are still due for a further decrease, but in this readjustment, an opportunity is offered to put the wages on a different basis than that which existed in most companies before the war. Reference is made particularly to companies which used to have a high labor turnover.

Statistics of the present rate of turnover on the average electric railway property are not available, but it is safe to say that generally it is much lower than six or seven years ago. It is also a matter of observation that the physical and mental and other standards which go to make up a desirable trainman are being exhibited in a higher degree than before the war. All of this helps toward efficient transportation, and, in the last analysis, toward economical operation. The higher wages paid on one-man cars tends also along these lines.

The future wage for motormen and conductors should be sufficient to attract men of a high grade permanently to the service and not simply to take it as a stop gap between better paid industries. The companies should cut loose from the unskilled labor theory and should make employment on the platform attractive to the kind of men who can give economical service from every viewpoint. The public has got away from the 5-cent flat fare and will expect good service, regardless of the rate of fare. The companies will not be allowed to earn more than a fair return, and in their own interest as well as in that of the public, the most certain way of supplying good service should be followed. This is to pay good wages and get in return from their men faithful and efficient work, commensurate with the wage paid.

## How Manufacturers Safeguard Their Products

THE attention which manufacturers give to the testing of the raw materials which enter into the apparatus supplied to electric railways and the extensive precautions that they take in testing such material are amply illustrated in the article by John S. Dean on testing insulating material, the second and concluding part of which is published in this issue. In reading these articles one cannot but be impressed by the large variety of insulating materials which are used in the construction of railway apparatus. In the selection of such materials it is most essential to take into consideration the operating conditions, which are extremely severe for electric railway equipment. High temperatures are encountered, the trolley voltage is most variable and line surges are frequent. The equipment is exposed to considerable moisture, dust and dirt, and is subjected to severe mechanical strain, as well as excessive vibration and frequent abuse by rough handling. Ruggedness in construction is as essential as high dielectric strength.

The proposed tentative methods of testing insulating varnishes which were included in the report of committee D-9 on electrical insulating materials for the American Society for Testing Materials at its recent meeting follow along the line outlined by Mr. Dean for the testing of liquid insulating material. The tests given are intended for varnishes which are applied by brushing, dipping or spraying, in order to provide high electrical insulation. The dipping of coils and even complete armatures by electric railways has increased considerably during the past two years, and the reduction of troubles which has resulted has shown the great advantages to be obtained. Those who have had experience in dipping and baking processes have found water absorbing tests and endurance tests to be most desirable. Another important consideration which directly affects the time that cars are withheld from service is the time necessary for drying. Tests for determining insulating compounds which will have a short period for drying and at the same time possess the necessary dielectric strength and other insulating properties are of interest. Aside from the essential characteristics that are necessary for insulating materials, this description of the method and apparatus used by a prominent manufacturer for determining these characteristics should give those interested a broader conception of the care used to safeguard the various products which they purchase.

## Capitalize—or Amortize?

THE brief which sets forth the arguments of the Public Service Railway in support of its valuation is one of the most interesting documents in this line which has appeared for some time. It is thorough, it is out of the ordinary, it is legal, and it has touches of appreciation of the lack of conception of the railway problem by the usual citizen.

But there are two or three points with reference to which questions of best valuation policy — or public policy, perhaps—may well be raised.

One of these is the advisability at this time, if ever, of arguing in favor of unit prices on a particular date. This is admittedly in line with the association's valuation committee recommendation, but that makes it all the more important that this question be examined with due care and consideration. Prices of many articles are admittedly going down, and while pre-war value will probably never be realized, the public consciousness cannot but carry the feeling that it is the future return upon the value of the property which is of most importance. Legally, present value—present-day value—has much to support it. Any modification of that to certain trend conditions or estimated future conditions can of course be supported only as a question of public policy, but that is worth considering seriously when companies are presenting final arguments on definite figures.

Another point which it will be most interesting to have determined, as mentioned editorially in these columns under a discussion of the Ford, Bacon & Davis valuation of this same property (see ELECTRIC RAILWAY JOURNAL, April 23, 1921, page 758) is that of capitalizing the "power contract." As the brief states, every witness testified as to the value of this contract to the railway company. The question it will be interesting to have decided by a court, if possible, is whether the value of such a contract should be reflected by an increased legitimate capitalization or rather by an increased rate of return in recognition of the good management which is evident in thus obtaining power at a lower rate than the railway company could realize under its own operation.

The third, and perhaps most important, point from the standpoint of policy is the question as to whether certain sums of money, admittedly invested and invested legitimately, should be added to capital or should be set up as a fund to be amortized. Reference here is to consolidation value—again possibly a question of good management rather than either capitalization or amortization sums—superseded property and certain other elements of value which, in any private business, would be amortized as early as possible. This is not an argument in favor of eliminating such amounts from consideration on the theory that they should have been amortized out of excessive dividends in the past; there probably were no excessive dividends, and there certainly is no basis to assume them without positive evidence of them. This is rather a suggestion of much better public policy to set up such expenditures as amortizable funds so that they may be eliminated from the perpetual charge upon the community. This may not be the best for the market value of the securities at the instant, but it is apparently the best business in the long run. There is also the question as to whether or not there is much more probability of having such sums allowed in their entirety when set up as amortizable funds than when added to capital. Virtually, of course, when it is probably impossible to earn enough to pay a return on the allowed valuation and to pay off installments on amortizable funds the fund to be amortized is added to capital for the length of time it still exists in the accounts of the company. The same end is realized, then, in a manner which has much to support it as being a more logical plan to present to the public, one which will appeal more to men in other lines of business who are accustomed to write obsolete equipment off of their property accounts and one which, to repeat for emphasis, is better public policy. Legally, either may be correct. To amortize where possible seems better business.

## Material Testing Specifications Are Important

SOME of the advantages to be obtained by the adoption of standards of materials were given briefly at the last meeting of the Society for Testing Materials by George S. Webster, the retiring president. The list follows: (1) Ease in specifying the quality of the material required; (2) ease in testing materials delivered under the specifications through the use of standard methods; (3) ease in obtaining standard products; (4) an effective means for minimizing controversies over purchases of materials, and (5) a feeling of security that the materials used are satisfactory as a result of the knowledge of how the standard specifications are formulated and that they reflect the latest knowledge and experience.

For a number of years this paper has abstracted the discussion on specifications of interest to electric railway engineers at meetings of the American Society for Testing Materials, and an account of the action taken by the society at the recent meeting at Asbury Park appears on another page. The importance of testing the various materials used by electric railways is being given increased consideration by those responsible, and the American Society for Testing Materials has long been considered as foremost in formulating specifications for this particular branch of engineering. This year the society achieved a remarkable performance—probably without precedence in its history—by dealing with more than 150 specifications. Of these seventy-one were new, being presented for the first time and adopted as tentative standards, while sixty-three were revised. Others were advanced from tentative to standard rank. Some forty steel specifications were disposed of in bulk by a single ballot. The flatness of this procedure was relieved somewhat in the closing session by an animated discussion over chilled-iron car wheels. This discussion brought out the desirability of chemical limits for car wheels and for making wheels safer by requirements more severe than those set up by the Master Car Builders and the American Railroad Association as well as those with which the committee on cast iron of the American Society for Testing Materials was content.

The method of procedure for the various committee reports and the care used in the adoption of specifications by the society are shown in the specifications of concrete which are now being formulated.

At last week's meeting the preliminary report was made public and in the form now written it will be circulated among the members of five contributing societies—which means about 16,000 engineers. This report will be a subject for discussion among those engineers and their committees during this year, and the committee of the American Society for Testing Materials will then proceed to the writing of the final specifications with due consideration of the various points brought out in discussion.

A number of the standing committees of the American Electric Railway Association are now co-operating with committees from the American Society for Testing Materials toward bringing into agreement similar specifications, therefore the work of the society accomplished this year is given added interest to electric railway men.

## Reorganization Committee Suggests Constructive Program

AS INDICATED on another page of this issue, the special reorganization committee appointed by President Gadsden to make recommendations to the executive committee with reference to the reorganization of association headquarters and any other modifications of existing activities or rules of the association which it thought advisable now has its report in the hands of the executive committee in practically final form. In order, however, that there shall be "open covenants openly arrived at," the committee is making public the gist of its recommendations to the executive committee before the meeting of the latter committee in order that it may have the benefit of comments from the field with reference to the recommendations made by the reorganization committee.

The recommendations are constructive. They are all an effort to make the association's activities more useful to the membership—the only reason for the existence of the association. It is recognized that the association is a voluntary organization and all that is done is to modify the machinery so that, judged from past experience, it will run more effectively. That considerable revision of the constitution was advisable is not unexpected. The revisions, however, are not radical, but only provide those things which leading opinion in the industry have felt for some time were either necessary or advisable.

The fact that the executive committee will meet monthly if the recommendation is adopted will of itself mean more virility in the association and more active interest in the conduct of its affairs by its officers. That membership modification should be made so as to allow in special cases admission of trackless transportation systems and to allow management companies, consulting engineers, investment bankers, etc., to assume a formal place in the association is a logical development. Provision for regular standing committees with obligation of monthly progress reports should also tend to add life to the association activities.

Of the questions recommended to the executive committee for its own consideration, those concerning co-operation with the various sectional railway associations, those having to do with an adequate geographical distribution of the executive committee and other committee meetings, as well as geographical representation on all the committees, and the one regarding admission of municipally owned or operated railways deserve consideration by the membership at large. All but the last speak for themselves. On this question there is bound to be considerable honest divergence of opinion, some of which has already developed, but the question has been raised and must be met squarely and settled. The editors of this paper believe that the association and the industry would benefit by permitting such municipalities as desired, when they operate their own railways, to enter the association and discuss problems in which all railways are mutually interested. The editors of this paper do not believe that the American public is so organized at present as to be able efficiently to operate transportation systems, but where municipalities have taken over the responsibility, it is to the interest of the entire electric railway industry that the municipalities understand all the problems which they have assumed. Furthermore, it is only by sitting down at the same table with experienced transportation men that municipal officers will be able fully to appreciate the magnitude of what they have undertaken. But on this question the executive committee deserves especially to have advice from the industry. It is probable that the final discussion on this point will not be conducted until after prolonged, and, it is to be hoped, intelligent, debate at Atlantic City in October.

As a whole the report means progress. That the final action be word for word in line with the recommendation of the committee is immaterial. A frank discussion of the questions which have been raised and action by the association on them is in itself worth while and the association will be better for it in the end.

## Covering Up Their Deficiencies

SEATTLE continues to go behind in the operation of its municipal railway. The fact sticks out like a sore thumb, for Seattle is at present on the cash-and-carry basis. Explanations may tend to mitigate the feelings aroused by the fact that things are bad with the road from the standpoint of earnings, but excuses don't remove the evidence. Every month new explanations for the poor showing have to be thought up. This has taxed the ingenuity and strength of the representatives of the city, but they have not run out of ideas entirely. Thus Councilman Erickson has hit upon the clever scheme of overcoming this need for establishing the monthly alibi by charging a 3-cent fare on the lines and meeting out of general taxation the difference between the receipts of the road and the cost of operation.

Apparently, Seattle cannot and will not pay more for fare, so that the avenue of escape is closed which that procedure might open. If car riders won't pay more, then let them pay less. The psychology behind the idea is correct from the standpoint of good politics. And with the railway supported by the tax rolls the sky of course would be the limit on expenditures. The plan would seem to be so palpably absurd as to preclude its adoption, but then there is no telling to what lengths a community will go in continuing to fool itself that municipalized its railway in spite of the preponderance of evidence against such undertaking.

# Bond Testing Cars

### To Test Bonds at a Faster Rate than Can Be Done with Hand Bond Testers and to Provide Automatic Permanent Records of the Test a Car Containing the Necessary Instruments Is Most Convenient

By G. H. McKelway
Engineer of Distribution Brooklyn (N. Y.) Rapid Transit Company

WHEN a car is used for bond testing it is necessary to insulate the front and rear trucks, or front and rear wheels in a single-truck car, from each other. With a single-truck car the truck must be cut and insulation inserted between the two sections. Much better results in maintaining the car, although not in testing the bonds, will be obtained from a double-truck than a single-truck car as the cutting of the frame weakens the latter and permits the two ends to sag.

Either a motor-generator set is necessary to supply the current for the test at a low voltage or a resistance to reduce the voltage of the current from the trolley wire or third rail sufficiently to permit of its being used in the test. The motor-generator set or resistance should be large enough to supply 800 to 1,000 amp. at 5 volts, although so large a current will seldom be needed and the average amount will be only about one-half of the maximum capacity.

In addition to the motor-generator set there should be in the test car a table upon which all of the testing instruments can be mounted and grouped so that they can be conveniently read by a single operator. The instruments should comprise an ammeter and two millivoltmeters, together with apparatus for protecting the latter in the case of bad joints which might otherwise throw a high voltage across them and burn them out. The ammeter measures the current supplied to the test circuit by the motor-generator, while the voltmeters indicate the drop across the joints as the car passes over them, one voltmeter being in position to measure the drop across the joints in one rail of the track and the other being similarly placed in regard to the other rail.

The voltmeter circuits are continued to the track through brushes which rub on the rails and which are spaced 4 or 5 ft. apart so that they will always be certain to span the joints no matter how long they may be. It is very difficult to pick out and record the locations of all of the bad joints by this method, even when the car is moving quite slowly, especially if the poorly bonded ones are close together. With the car moving at a speed of only 5 m.p.h. and with all rails fully 30 ft. long, the contacts will pass over one joint in each rail every four seconds. If the joints happen to be staggered, one voltmeter or the other will be swinging every two seconds. When a line of bad track is being tested the open joints come so frequently that it is almost impossible for the locations of all of them to be recorded unless the car is stopped occasionally to allow the observer time to catch up. If this is done it will "drag" the cars behind it and spoil their running schedules.

One way of directly marking bad joints, not so permanent as with the hammer and chisel, but which lasts long enough to permit the bonders to find the joints, and which does not require stopping the car, is by squirting a little white paint on the rail, tie or pavement as the car passes along. Most of the cars now in use are equipped with recording instruments. The record shows the condition of the bonds and indicates the moment that the bond is passed over. These cars are known as "autographic" bond testing cars and are the invention of A. B. Herrick. Their equipment, however, is so complicated that a perpetual inducement is offered to change some of the details in an effort toward greater simplicity or less troublesome maintenance. A short time ago the writer asked another railway engineer if there was not a "Herrick" test car on his line. The reply was that it was a Herrick car when first bought, but did not look much like one now. In fact, all of the cars that the writer has seen or heard of appear to differ considerably among themselves, although the general principles on which they operate are the same.

## AUTOGRAPHIC RECORDS

On the autographic cars the record is made on a long roll of paper which is unrolled and carried across the table, a small motor furnishing the power for operating the drive. The strip of paper is 11 in. in width, and as it passes five pens, two for each rail and one for marking locations, make continuous marks upon it. Two of the pens merely mark the zero lines, indicating where the millivoltmeter lines would be if there was no drop in the rail, while two others are for the purpose of locating open joints, which is done by the pen moving from side to side whenever the voltage across the joint is so high as to make the relay, which protects the voltmeter, operate a cut-out. The fifth pen, for marking locations, is moved through a switch closed by the operator or his assistant whenever the car gets opposite some point, for instance a house or trolley pole, which will serve as a permanent location for the starting point of measurements to give the exact location of the bad points in its vicinity. On one window on each side of the car and directly opposite the seat of the operator is painted a plain, vertical stripe. When the object whose location is to be recorded is covered by the stripe the operator presses a key and the pen, which has been making a straight line down the center of the paper as it moves past, makes a jog. This jog is given a number by means of a numbering stamp, the numbers of which increase by one each time it is used and so numbers the pen jogs consecutively. A sheet of paper already numbered is used to record the house or pole number, or name of intersecting street or something else that will definitely mark the location of the car at the time that the pen moved. Where the bonds in the track under test are in good condition the location points need be taken only occasionally, but the worse the track the closer they should become, and with bad track 400 or 500 ft. apart is a good spacing distance.

A toothed wheel revolving in the center of the table punctures the paper at intervals, each space between the holes being equivalent to 10 ft. on the track. At each tenth hole an additional hole is punched about one-quarter of an inch outside of the center so that the 100-ft. lengths are easily counted and it is not necessary to count all of the dots representing 10 ft., but only those to the nearest 100-ft. mark.

As the car moves along, the current in the track and the current from the motor-generator set cause the voltmeter needles to deflect a certain amount, which is comparatively constant, and which shows the difference of potential between the two brushes on a piece of unbroken rail. The current in the rails due to the operation of the cars may be either added to or subtracted from that produced by the motor-generator set and occasionally the latter should be cut out, by opening the switch, in order to see in what direction the current in the rails is flowing and its value.

### RECORD PAPER MOTOR DRIVEN

In addition to the generator which is used for supplying a heavy current at a very low voltage there is also a smaller one supplying current at about thirty volts, which current is used for the paper drive and also, after passing through a make-and-break device of some sort, and through condensers, is used in recording the difference of potential between the brushes on the rail. One side of this circuit is connected to the voltmeter needles which swing over the paper and also over contacts which are underneath the paper. Between the ends of the needles and the contacts below sparks are drawn which puncture the paper, each needle making a dotted line of little holes which are burnt in the paper and which show every swing of the needle and its amount except in those cases where the drop is so great that the relays have to act to protect the instruments. In those cases the little holes will run up to a peak at the point where the relay cuts out, and on the pen line underneath the peak and near the edge of the paper will be found a sharp jog, showing that the joint is "open."

Although some cars have been operated with only two men, a motorman and an operator, yet such an arrangement throws so much work on the latter that, as a rule, it will pay to use at least one more man in order to pick out and record the locations on the separate sheets of paper while the operator stamps the corresponding numbers on the record at the points shown by the movement of the pen. In addition to marking the locations on the record the operator will make use of other stamps reading "special work," "railway crossing," etc., in order to explain the sudden throws of the voltmeter needles not attributable to bad bonds. He also stamps "right rail" or "left rail" and "inbound" or "outbound," as the case may be, on the record occasionally so that there will be no mistake in reading the record later and, from time to time, he opens the generator circuit and tests the direction of the flow of current in the rails. This should always be done when there is reason to believe that its direction has changed as, for instance, just after passing a point where return wires or tracks are expected to lead the current to a power or substation, and at fairly frequent intervals elsewhere.

The voltmeters are supplied with two scales, one giving a reading about twice as high as the other. By making use of the proper scale and regulating the output of the motor-generator it will always be possible to get the record on a fairly large scale and yet not have "opens" shown where they should not appear, whatever may be the weight of the rails and the condition of the joints.

After the record has been made that portion of the paper containing it is cut off from the rest of the roll and gone over to be put in permanent condition for filing and to have the locations of the bad bonds placed in more convenient form for handling and carrying about in the field, so that the poor joints can receive attention as soon as possible.

INTERIOR ARRANGEMENT AND LOCATION OF APPARATUS IN BOND TESTING CAR

The first step is to mark at each of the numbers what that number is supposed to indicate, as then no time is lost by having to refer to the separate sheets, which need be kept no longer as all of the information is then on the large roll. These locations can be written on with pen and ink, although the neatest way is to typewrite them at the proper points. Then, having determined on the maximum resistance of the joint expressed in terms of feet of continuous rail that can pass as good, find all of the joints the resistance of which was higher than that amount and mark them for rebonding. If only the "opens" are to be considered as bad the task is comparatively easy, as it is necessary only to follow the two pen lines and mark down those places where the jogs in the line show that the voltmeters had been cut out of circuit. Where the bonding is to be kept in better condition and joints of a lower resistance are to be rebonded the curves made by the arcs from the voltmeter pointers must be closely followed, and whenever the height of a peak exceeds the predetermined ratio between that of the joint and the uncut rail the location must be marked for rebonding.

Some of the papers used for these autographic records are chemically coated so that the minute burns in it show up black and can be readily seen, but such paper is more difficult to puncture than the plain paper and often cannot be obtained. Another method of blackening the holes is, after the record has been made, to paint the underside of the paper along the general lines of the curves with ink or thin water color paint so that some of the color will pass through the holes and show on the upper surface of the paper. This takes additional time and is not reliable as the color does not always come through. Probably the best method of following the curves is to pass the record before a light and have the light shine through the little holes. This can be done either by holding the record up in front of a window or, better still, by passing it over a box in which is contained an incandescent lamp or lamps.

### TABULATING RECORDS FOR FOREMEN

In order accurately to locate the bad joints for the bonders, their locations are generally copied on sheets of paper, which are given to the foreman in charge. A well-planned sheet of this type is printed with spaces to be filled in, giving at the top the name of the street, the streets between which the test was made and the date of the test. Below are columns in which to locate the joint as a certain number of feet in a given direction from an easily found point; the direction of traffic on the track, if there is more than one track on the street; whether on the right or left rail of that track; the date repairs were made, and the type of bond used in making the repairs. By the use of such a sheet not only does the bonding foreman receive all of the information that he requires but, when he returns the sheet after finishing the work, the office has a complete record of all of the bad joints and when and how they were repaired.

The records made by the testing car should be valuable, not only at the time of making the test, to point out the bad bonds, but also as legal evidence in case of any suit brought on account of the alleged defective condition of the bonding. The writer has found, however, an unwillingness on the part of several lawyers to make use of the records in such cases, as they feared that the height of the peaks of the curves would be misunderstood by the non-technical members of the jury, who would not be able to understand that what appeared to them to be very sudden sharp rise in potential would, in fact, be only a very few millivolts and therefore negligible in considering the question before the court. It would seem, however, that such records could be used very effectively in some cases if the curves were carefully explained, in a manner that all could understand, by some one who knew just what the records showed and could bring out those points to the best advantage.

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During this year the Grosse Berliner Strassenbahn, the tramway system in Berlin, celebrates the fiftieth anniversary of its founding. Long operated by a private corporation, the system has recently been taken over by the municipality and consolidated with the other surface lines in Greater Berlin, so that it now serves all parts of that district, which embraces about 5,000,000 inhabitants. The property itself consists of 1,250 km. (800 miles) of track.

## Factors Affecting Electrification

COMMENTING upon the elaborate analysis of electrification conditions on the Northwestern Railway of India, which has been running in its columns for some time, the *Railway Engineer*, London, calls attention editorially to some of the points that have been brought out. These illustrate the importance of a knowledge both of electrical engineering and of railway working in making a decision on the electrification question.

The editorial states that the author of the article in question shows that for the same adhesion weight electric locomotives can be designed to develop two or even three times the power of the heaviest steam locomotive in India. By articulating the design, the number of driving axles could be multiplied indefinitely with the same permissible axle weight and it would be possible to put a 3,000-hp. electric locomotive on the Northwestern which could run anywhere where two coupled or doubled engines of the 0-6-0 standard type can now run and would be capable of hauling loads five times as heavy.

The large number of heavy grades on the Northwestern are an extremely important factor in the electrification problem. The present and previous articles show that electrification will pay on many lines with heavy grades where for the same traffic on the level it would be out of the question. On a 4 per cent grade the electric locomotives can do at least 40 per cent more work than a steam locomotive with the same expenditure in energy. To this must be added the economy resulting from regenerative working, which also saves rail and brakeshoe wear. It is said by the engineers that on the Giovi tunnel line near Genoa the rail saving was enough to pay the whole interest on the cost of power station and transmission line. The enormous increase in the cost of coal and repairs has more than offset the increased cost of electrical apparatus, and the *Railway Engineer* expresses the belief that it will be found by those engineers who have the time to make a really accurate study of the conditions obtaining today on many lines that the changed conditions often make electrification worth much more serious consideration than before the war. As for the capital outlay, the difficulties here are apt to be lessened when the directors are really convinced of the savings which can be effected through the application of electricity to heavy traction.

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## Toronto Retains Odd Gage

CONTRARY to what was popularly expected, according to the *Canadian Engineer*, the 4-ft. 11-in. gage at present existing on the lines of the Toronto Railway, Pacific Railway and the MacKenzie Radials, with the exception of the Metropolitan, will be retained by the Toronto Transportation Commission when it co-ordinates and rehabilitates the several systems within the city. The Commission felt that a change of gage, the estimated cost of which had been figured at $1,500,000, showed no immediate advantage and would be likely to increase the operating difficulties until the work was completed. One point which swayed the Commission in reaching its decision was that outside systems will not be able to get running rights over Toronto tracks, as their cars would be of the wrong gage. It is said this was why the odd gage was originally chosen for the Toronto system.

# Testing Insulating Materials—II

### Aging and Weather Tests Are Important to the Users of Railway Insulating Materials as They Show What Life Can Reasonably Be Expected and the Deteriorating Effects that Result

BY JOHN S. DEAN
Railway Motor Engineering Department, Westinghouse Electric & Manufacturing Company

IT IS ESSENTIAL THAT SPECIMENS FOR THE DIELECTRIC TEST ARE PROPERLY TREATED

IN AN article published in the May 21 issue of the ELECTRIC RAILWAY JOURNAL some strength and dielectric tests of treated and untreated insulating materials were described. In the following, attention will be given to tests showing the effects of heat, acids, oil, weather, etc., on treated materials, together with various essential tests on composite materials.

## AGING TEST OF FLEXIBILITY

To determine the ability of a varnish to retain its flexibility under the action of continued heat such as is found in a railway motor in service, the only apparatus required is a suitable baking oven fitted with a high-reading thermometer or an indicating or recording pyrometer. Test specimens consist of strips of sample cloth cut 6 in. x 3 in. which are given several dippings of the varnish to be tested. A space is left untreated at the top of the samples to record the test data.

Four samples are prepared and placed in an oven which is maintained at a temperature of 100 deg. C. The samples are removed one at the end of 100 hours, the second at the end of 200 hours, the third at the end of 250 hours and the fourth at the end of 300 hours.

These samples are then tested by folding or bending over rods of different diameters and noting the smallest diameter around which they may be formed without cracking.

A test specimen which after baking 300 hours at 100 deg. C. and allowed to cool to room temperature can be folded and creased without showing any indications of cracking is considered very satisfactory.

In the operation of railway motors, due to careless and in some cases too frequent oiling of the bearings, excess oil finds its way inside the motor frames. In this connection it is important that the varnish used for insulating purposes should not be affected by this oil, and to this end it is advisable to use an oil-proof grade of varnish. To make an oil-proof test samples of cloth are prepared similar to those used in connection with the aging test, and after being thoroughly baked they are placed in a mineral-oil bath, which is held at a temperature of approximately 60 deg. C. for several days. If the varnish on the treated sample shows no signs of softening or becoming tacky, this is an indication that it is proof against the action of the oil. A similar test can be quickly made on the baked treated samples of cloth by rubbing them with oily waste. Under these conditions, if the varnish is oil-proof, it will not soften and cannot be rubbed off the surface of the cloth. The acid, alkali and salt-water test is made on insulating varnishes used in treating coils, etc., to determine ability to withstand their action.

## TESTS FOR OIL, ACID, ALKALI AND SALT WATER

To make the test a large rectangular glass jar is fitted with a wood rack and a number of metal test rods and a testing circuit with a light in series is arranged. Test specimens consist of ⅜-in. round steel rods 12 in. long, well rounded at the lower end, which are given a uniform coating of varnish 2½ mils thick baked on the entire surface to within several inches of the top of the test rod. In preparing these test specimens the bare rods are first thoroughly cleaned and dipped in the sample of varnish and baked. This operation is repeated not less than three times, and sometimes more, depending upon the fluidity of the varnish in order to get the desired 2½ mils thickness of film which is specified for this test. The treated test rods are then placed in the rack which insulates individual rods and are suspended in the acid, alkali or salt-water solution contained in the glass jar. During the first four hours of the test an alternating current from a 110-volt circuit with a light in series is applied every fifteen minutes through the terminals one of which is connected to the liquid solution and the other is applied to the individual test rods for a short interval of time to locate any breakdowns. After this set of short-time readings is taken similar tests are made each morning and evening until the insulation breaks down or the test has run its specified time limit. In connection with these tests either a saturated acid, alkaline or salt-water solution is used, depending upon the nature of the test. The final results are represented by the average on three test rods of each grade of varnish.

PAINTS AND VARNISHES ARE SUBJECTED TO ACTUAL WEATHERING TESTS

The amber insulator used in connection with the dipping and baking of railway motor armatures when tested under the above conditions shows an average of 880 hours in a saturated solution of salt water.

### CEMENTING AND STICKING QUALITIES OF VARNISH

To determine the ability of a dipping varnish to cement the treated coil into a solid, tough, elastic mass, which will be strong mechanically as well as electrically, a sample coil is wound up, using about No. 20 B. & S. gage double-cotton-covered wire, is given two dips of the test varnish and is then baked for 300 hours at a temperature of 100 deg. C. The coil is then removed from the oven and inspected for its toughness and elasticity as compared with a similar coil that has not been treated.

In order to improve the distribution of the heat which is generated in the various parts of the winding of a motor it is essential to use a varnish with good heat conduction and radiation properties, to insure a more uniform temperature of the motor under service conditions.

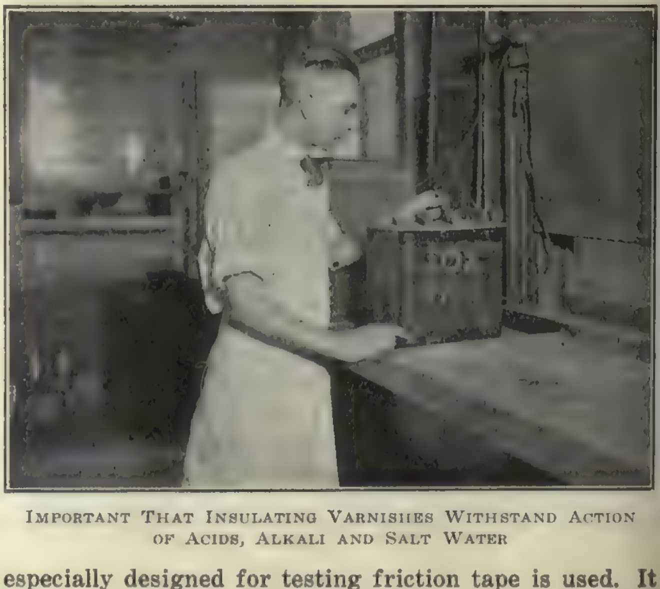
To test for heat conduction and radiation two coils are wound up with the same size of wire and the same number of turns, identical in every respect. One of these is treated with the varnish and baked, while the other is left untreated. These coils are connected in series and the resistance at room temperature is carefully measured by means of a Wheatstone bridge-testing set. A current is then passed through these two coils in series, resistance measurements are taken of each coil at stated intervals of time and temperatures are calculated from the increase in resistance. The difference in temperature of these two coils is an indication of the heat-conducting and radiating properties of the test varnish.

It is necessary to know something about the time and temperature required thoroughly to dry or bake out the insulating varnish. To get the best results with the least possible delay to production, samples of cloth or tin are dipped in the air-drying varnish and are hung up in the open. The time required to dry is noted and recorded. In testing the baking varnishes, the test samples after being dipped in the varnish are placed in the oven and baked at a constant temperature for a definite period until thoroughly dried. The temperature is then increased and the time noted. In this manner a number of tests are made with varying temperatures through a range of from 90 to 120 deg. C., noting the time required to bake thoroughly. The maximum temperature which will not damage the texture of paper or cloth to be treated is taken, as this temperature will expedite the production in the factory.

It is also very important to know just how certain paints and varnishes resist the action of weather under varying conditions, and to determine this a weather rack, such as shown, is constructed and placed on the roof of one of the shop buildings. On this rack the various treated samples are securely suspended and exposed to all weather conditions over a long period of time and are carefully inspected at stated intervals of time to determine their deterioration. These observations are recorded and comparisons made of the condition of the various samples of paints and varnishes under test.

### ADHESION TEST FOR FRICTION TAPE

To determine the adhesion or sticking properties of friction tape and cloth, which is very important with this kind of material, an adhesion testing machine especially designed for testing friction tape is used. It consists primarily of an upright support having a small swivel clamp which is connected to the pencil on a Thompson steam indicator through a system of levers. The lower clamp, which holds the test roll of tape, is connected to the cylinder on the Thompson indicator


IMPORTANT THAT INSULATING VARNISHES WITHSTAND ACTION OF ACIDS, ALKALI AND SALT WATER

and is driven in a vertical direction through a worm drive by a small electric motor.

The test specimens are cut 22 in. long from standard rolls of friction tape. In the testing of friction cloth the strips are made 1 in. wide, cut from the rolls of cloth.

The 22-in. specimen of test tape is rolled up on a test spool under a uniform tension of 5 lb. The test spool is then placed in the lower clamp of the machine, free to turn, while the free end of the tape is attached to the upper clamp. With a chart in place on the cylinder of the Thompson indicator and the pencil adjusted, the driving motor is started. This unwinds the tape at a uniform rate of speed, registering the pull due to the adhesion of the tape on the rotating chart. The readings in pounds are taken from ten uniformly spaced points on the chart and averaged. This test is repeated on a similar sample after the tape has been baked for sixteen hours at a temperature of 100 deg. C. The loss in adhesion, due to aging by heat, changes with different grades of tape. In general, it will vary from 35 to 50 per cent, depending upon the quality.

Paper treated on one side with shellac or bakelite varnish and used in the manufacture of micarta tubes, sheets, etc., should stick together thoroughly when subjected to heat and pressure during the process of manufacture.

Special detail apparatus, consisting of two electrically heated irons with controlling rheostat to regulate the heat and a 300-deg. C. thermometer for measuring the temperature of the heated irons is used for the test.

The test specimens are cut 2¼ in. wide and 12 in. long and are taken from the rolls of paper during the process of treatment. The test strip of paper is folded lengthwise, with the treated sides together, and pressed between the two electrically heated irons, which are held at a temperature of 105 deg. C. The crease is placed between the two irons with the two free ends extending out from underneath the irons. To the lower free ends is attached a 30-gram weight, while the upper one is held to the side of the iron. After thirty seconds' application, or pressing, the top iron with the free end of the test specimen is lifted, allowing the treated surface of the test strip to be pulled apart due to the action of the 30-gram weight suspended from the lower free end. The adhesive property of the test specimen is gaged by the amount of separation at the treated surfaces as measured on one side of the folded test specimen.

BUILT-UP MICA AND PAPER SUBJECTED TO A DIELECTRIC TEST BEFORE GIVEN FINAL GAGING TEST

This method of testing gives comparative results only and is a check on the uniformity of the treated material. Under these conditions a piece of treated paper used to make micarta tubes, etc., as used for insulation on railway motor parts, will show a separation of from ¾ to 1¼ in.

MICA FOR RAILWAY MOTOR COMMUTATORS IS TESTED FOR UNIFORM THICKNESS

### TREATING TEST SPECIMENS

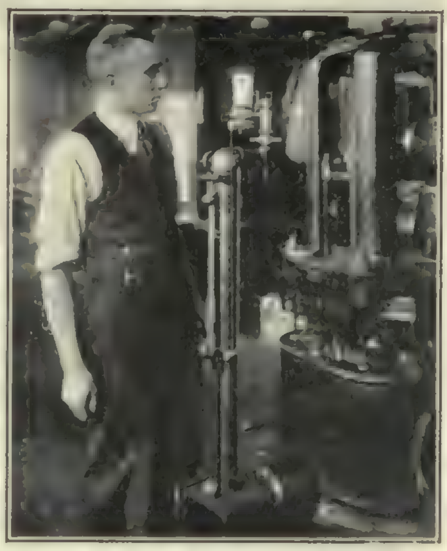
In connection with the preparation of samples of treated cloth and paper for the dielectric test it is very important that the untreated materials be given a uniform and even coating of the varnish. This makes it necessary to draw the samples through the varnish at a slow uniform speed so as to eliminate any variation of the coating on the surface of the treated samples which are being prepared for test purposes. The apparatus used consists of a motor-driven hoist, to which the sample test sheets are attached and pulled through the test sample of varnish.

The sample varnish, which is poured into the glass jar, is diluted to have the same specific gravity as is used in the factory and is kept at room temperature. The test sheets of untreated material, which are cut 6 in. square, after being thoroughly dried out, are attached to the hoisting mechanism and drawn through the varnish at a uniform rate of about 14 in. per minute, after which the samples are baked in an oven for a certain number of hours at a definite fixed temperature, which depends upon the grade and quality of varnish being tested. Amber insulator samples require baking at from six to eight hours at 110 deg. C. From two to four dips are given all samples and in making successive dips the direction of drawing the sample through the varnish is reversed to insure uniformity. All test samples are gaged with a micrometer before treatment and after final treatment in order accurately to determine the thickness of the coating of the varnish on the test specimens, which should be approximately 3½ mils total for both surfaces.

To determine the dielectric value of sheet insulating materials in their original plain uncreased form a high voltage (at least of 1 kw. capacity) transformer is used. This is provided with a number of taps and is arranged for voltage control using a regulator so designed that the circuit is not broken between steps. Two circuit breakers, one on each side of the low-voltage line, and a voltmeter are required. A testing board is fitted with two short brass terminal rods 2 in. in diameter, having the edges on one face well rounded. One of these terminals is permanently mounted upon the baseboard and the other is hinged to the board and so located as to rest on top of the fixed terminal when swung in position on the test sheet.

Test specimens cut 8 in. wide and 2 ft. long are taken from the treated rolls and should be selected free from defects such as creases or rough lumpy surfaces. The test sheet is placed between the two brass test terminals so adjusted that each terminal makes a good face contact with the material. The test voltage is raised rapidly and steadily and the reading of the meter is noted when breakdown occurs. While making this test care must be taken that a puncture and not a flash over the surface is obtained. The average of five or ten breakdowns is taken as the final dielectric test of the sample.

To determine the amount of moisture that a treated sample of cloth or paper will absorb under conditions of exposure to water, the sample, which consists of a section of the treated material 6 in. square, is carefully weighed and then immersed in a jar of water and kept at room temperature for twenty-four hours, after which it is removed and all surface water wiped off with a dry cloth. The sample is again weighed. The percentage of moisture absorbed is then figured by dividing the difference between the weight of the sample before immersion. Immediately after the moisture test has been made the test sample is given a dielectric test to determine its relative dielectric strength before and after immersion.



EVEN THE ADHESIVE PROPERTIES OF FRICTION TAPE ARE DETERMINED

It has been found that a good grade of treated cambric such as used for railway motor insulation will absorb from 3 to 4 per cent of moisture under these conditions. This same sample of treated cambric will show a dielectric test before immersion of 9,440 volts and after immersion of 1,780 volts.

In making the above dielectric tests two samples are used, one for the "before immersion tests," the other for the "after immersion tests." These values represent an average of five breakdown tests, which are made at different points on the surface of each test specimen.

To insure a uniform thickness of the built-up mica used principally in the manufacture of railway motor commutators a metal surface plate on which is mounted an indicating micrometer is used. The jaws of this plate are actuated by means of a quick-acting lever. The readings are indicated by a needle on a uniformly divided scale on a large upright mounted dial conveniently located so that it can be read easily by the operator.

The test specimens are commutator mica segments and sheets used to make commutator V-rings and bushings. The material to be tested is placed on the surface plate and is drawn by the operator between the open jaws of the micrometer, while at the same time the controlling lever is pressed down with a uniform pressure, bringing the face of the jaws on the mica board and registering the thickness in thousandths of an inch on the dial. The operation is repeated a number of times over the surface of the sheet, and in general if material varies more than one-thousandth of an inch above or below standard gage it is rejected. Commutator segments that are 0.0005 in. over or under size are rejected.

All built-up mica sheets used in connection with the above work and before they are given this final gaging test are subjected to a light test by placing the sheets on a large pane of glass backed up by brilliant illumination, where they are carefully inspected for foreign particles and light spots. In this manner all impurities are removed from the sheets and the light spots are reinforced and built up, thus securing a clean, uniform product.

Mica cells for insulating railway motor field and armature coils are tested in order to weed out the defective sections due to poor workmanship and material. The apparatus used is a special testing machine built by the Westinghouse Electric & Manufacturing Company. The roll of composite material is mounted at one end of the machine as shown and as it unrolls the sheet passes over a plate and under two rows of spring-supported contact fingers about ¼ in. apart which are staggered, so that they cover the entire width of the sheet as it is fed through the machine. The material is subjected to a voltage test ranging from 1,000 to 10,000 volts, depending upon the grade of the material being tested, by connecting one side of the test circuit to the plate of the machine and the other to the sliding contact fingers. When a defect in the sheet is located by the material being punctured by the high-voltage test the machine automatically stops. The defect is plainly stenciled and the machine is again put in operation. This test insures the selection of a good grade of material for winding coils free from electrical defects and able to stand the final high-voltage test given the completed motor before shipment.

To eliminate the defects in connection with the commercial production of treated materials an experimental treating tower is used to treat materials on a larger scale than is possible by using strictly laboratory methods. This tower, which is under the direct supervision of the research laboratory experts, consists of a motor-driven series of rolls over which the material is drawn at from 10 to 40 in. per minute and is fitted with a combination of treating vats so arranged as to coat the material on either one or both sides, depending upon the requirements to be met in the factory. The tower is provided with a steam-heated chamber, the temperature of which can readily be adjusted and controlled to secure the range of baking temperatures, which will vary with the different grades of baking varnishes used in the treatment of the cloths and paper. This tower has greatly facilitated the commercial productions of the various grades of treated paper or cloth.

# Preparing for Pageant of Progress

### Extensive Terminal Facilities Have Been Built at the Municipal Pier in Chicago by the Chicago Surface Lines to Handle the Large Crowds Which Are Expected July 30 to Aug. 14

CHICAGO is to have a Pageant of Progress on July 30 to Aug. 14 which is expected to approach a World's Fair for exhibits and interest. It is to be held on the mile-long Municipal Pier, used primarily for shipping purposes but including at its outer end a large recreational center. The entire upper level and outer end of the pier are to be used in the pageant.

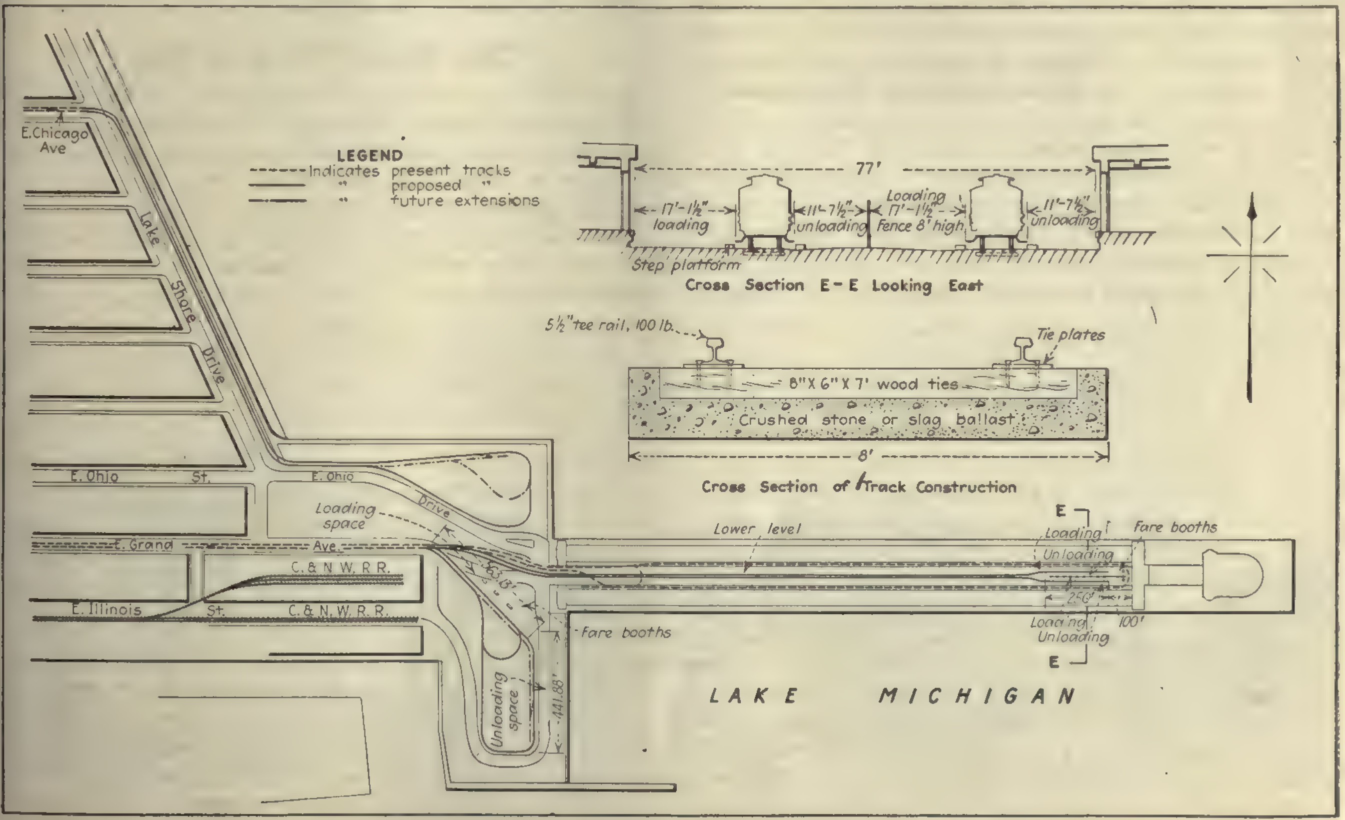
The Chicago Surface Lines built an extension to its Grand Avenue line at the time the pier was erected, extending the tracks out to the far end of the pier to serve directly the people using the recreation center. These tracks were built on the upper level of the pier, one track on either side with a loop at the outer end, and another loop at the land end of the pier for short-routing in winter. In making arrangements for the pageant, the city authorities desired to have the complete use of the upper level of the pier and therefore required the Surface Lines to remove its tracks from the upper level and re-lay them through the center of the lower level or main driveway. The entire work of tearing up the track and rebuilding it, largely from the same materials, on the lower level was completed in twenty-eight days, including the construction of extensive additional terminal facilities at the approach to the pier. Altogether 2¾ miles of track were laid, most of which was of the open-type construction.

In the construction of the tracks extensive use was made of machines to save labor and speed up the work. Three electric shovels were simultaneously employed. The first took up the asphalt which was hauled away. The second excavated the crushed stone used underneath the paving and placed it along one side of the trench for reuse. The third shovel then dug out the trench to the subgrade. Steam rollers were used to roll the subgrade and the 8 in. of crushed stone placed underneath the ties.

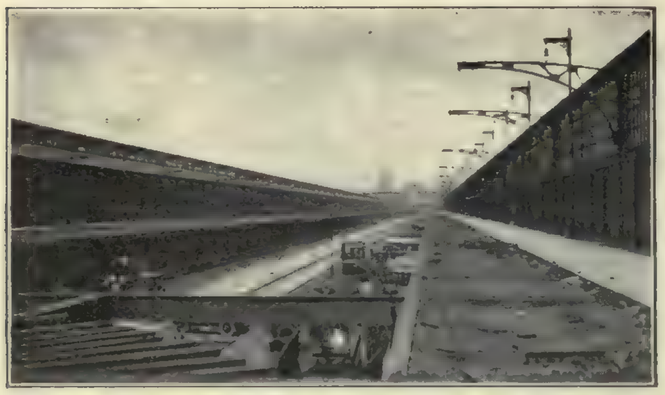
The 100-lb. T-rail and the wood ties were expeditiously transferred from the old to the new location by simply sliding them down ramps. The gravel ballast which had been used under the ties on the upper level was transferred to the lower level by shoveling into rough troughs which carried it to the edge of the lower track trench. Except for the fact that this transfer of gravel ballast took place on a rainy day, which changed the angle of repose of the material, it would have been possible to discharge the ballast directly into the lower trench. As it was, however, the pitch of the trough had to be steepened and the ballast discharged along the side of the trench, whence it was distributed. An Ingersoll four-tool air tamper, a Buda two-tool direct-current electrical tamper and a Jackson two-tool alternating-current electrical tamper were used in tamping the tracks.

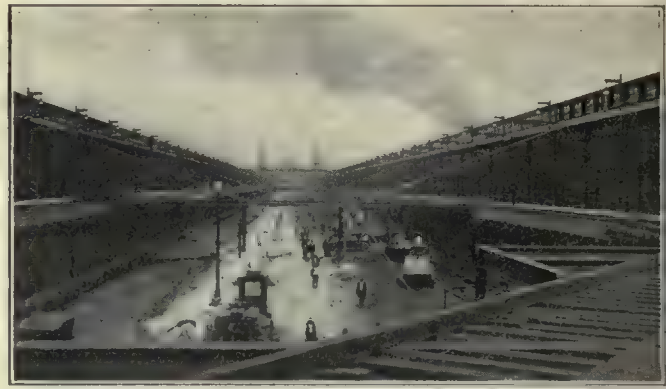
The type of track construction used on the pier is largely shown in the cross-section in the accompanying drawing. The six-bolt Weber joints used on the upper level were reused below. Pin-type bonds were used and were placed under the fish plates in the open tracks and outside the fish plates where the track was to be paved.

Terminal facilities for this track extending out on



LAYOUT OF NEW TRACK AT CHICAGO'S MUNICIPAL PIER, WHICH PROVIDES THREE TERMINALS FOR HANDLING CROWDS


THE STREET CAR TRACKS WERE REMOVED FROM THE UPPER LEVEL TO THE CENTER OF THE LOWER LEVEL OF THE PIER


LOOKING DOWN THE CENTER OF THE PIER. THE VIEW SHOWS NEW TRACK UNDER CONSTRUCTION AND METHOD OF SUSPENDING OVERHEAD

the Municipal Pier were provided by widening out the devil strip, stub-ending both tracks and providing a double crossover at the approach to the terminal. Each of these track ends has a capacity for five cars and the double crossover will make it possible to route the cars into either stub. Unloading will take place on one side of either track while the loading takes place on the opposite side.

On the upper level tracks the trolley was supported directly on steel brackets attached to the building and extending out over the tracks. When the overhead for the new track on the lower level was erected the old trolley wire was taken down, and these same brackets were used to support long span wires extending across the center driveway to the bracket opposite on the other building. The double trolley was suspended from these cross spans, over the lower level tracks. These span wires are about 100 ft. long but are under very little strain, as there is so much sag. Standard ⅜-in. stranded steel span wire was used. A wood strain insulator at the bracket, another adjacent to the trolley, and the trolley ear, provide triple insulation. This overhead construction is shown in accompanying views.

In addition to the stub-end terminal facilities at the outer end of the pier, the terminal capacity of the Grand Avenue line, which has served the pier alone heretofore, was greatly increased by the building of a long and short loop in front of the pier. This will be used particularly during the pageant, as the crowd, in order to see the exhibits, will leave the cars at the shore end of the pier and walk down one side to the far end and back on the other side. This will bring the principal loading and unloading requirements at the shore end of the pier. The short loop in the new terminal will be used when there is light traffic and the long loop only when traffic is heavy. Under heavy traffic conditions the cars will stop for unloading at the space indicated for that purpose on the accompanying drawing and then pull up to a new stop for loading.

The capacity of the surface lines to handle the expected crowds was also materially increased by extending the Chicago Avenue line down the lake shore and terminating it in a large loop in front of the pier. This track extends in the parkway adjacent to Lake Shore Drive for a distance of five blocks along the lake shore and is the only piece of track the Surface Lines has immediately adjacent to Lake Michigan. This track is almost entirely of open-type construction, employing center poles for the overhead along the parkway. It is planned to install cashiers' booths with fare registers or turnstiles and establish a prepayment area or sell tickets to speed up the loading.

## They Crowd Them in Italy

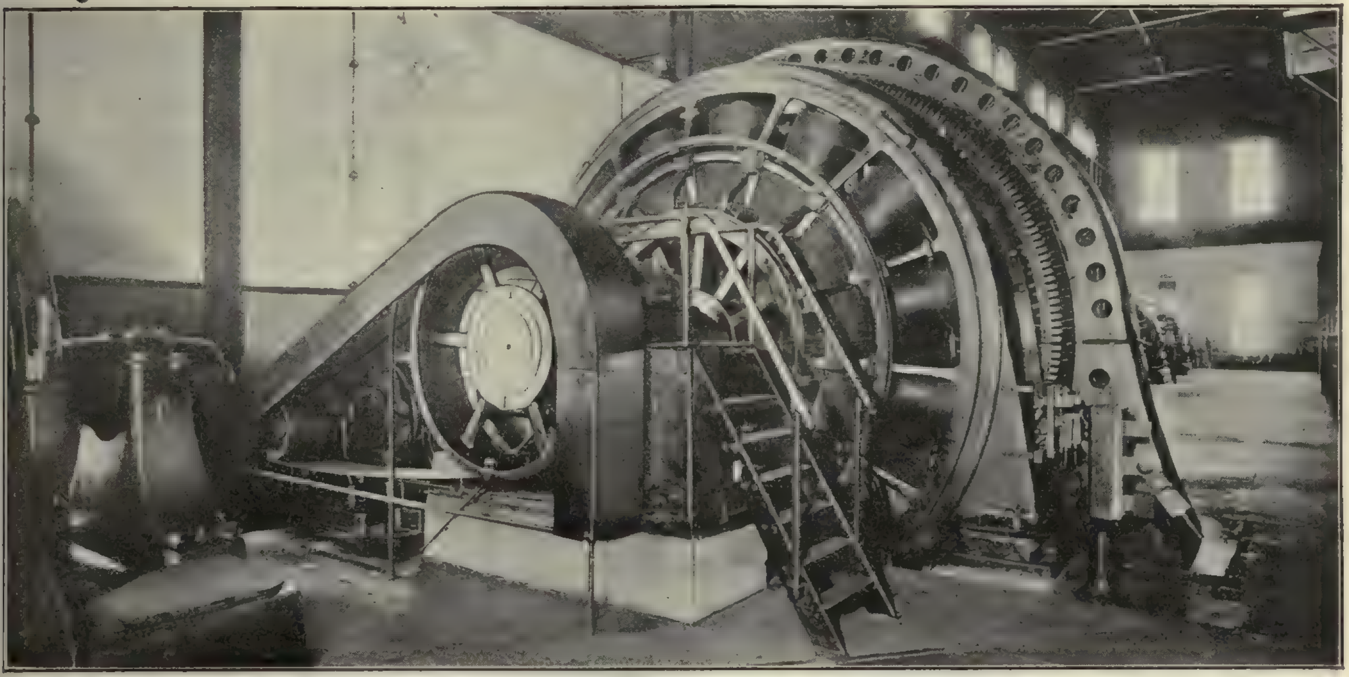
MARQUIS FERDINAND CUSANI, a member of the visiting Italian delegation of engineers, provided the illustrations from which the two accompanying halftones were made. In presenting these for publication for American readers, Marquis Cusani remarked that this would give proof that the United States was not the only place where it has become necessary to load street cars to their ultimate limit.

"COMPRESSION DES VOYAGEURS," AS THE FRENCH EXPRESS THIS ITALIAN SCENE

# Railway Motor-Generators in Winnipeg Rebuilt

### Three Old Direct-Current Generators and Two Alternators Direct Connected to Corliss Engines, Already in the Shadow of the Scrap Heap, Reassembled Into Two Motor-Generator Sets—Additional Capacity Has Been Obtained

BY W. NELSON SMITH
Consulting Engineer Winnipeg Electric Railway



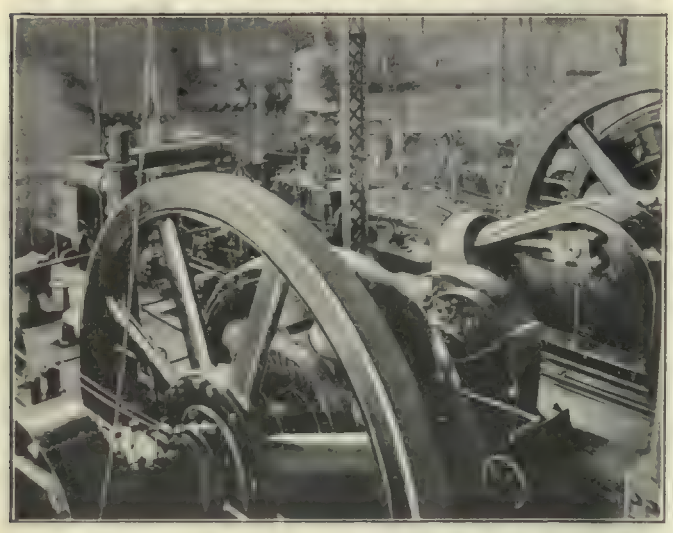
MOTOR-GENERATOR SET REBUILT FROM OLD GENERATORS
One 800-kw. alternator in the center operating as a synchronous motor driving two 400-kw. direct-current generators for three-wire service.

IN AN article published in the ELECTRIC RAILWAY JOURNAL for March 26, 1921, the writer describes the rearrangement of the substation equipment and the trolley distribution system of the Winnipeg Electric Railway. In the course of changing from two-wire to three-wire operation, for the purpose of electrolysis mitigation, additional motor-generator equipment became necessary. The prices asked and the time required for delivery by manufacturers during 1918 and 1919 were so unsatisfactory, however, that we made a study of the possibilities of converting some old station equipment to this new use and succeeded in accomplishing the desired results within the required time and with a small expenditure of additional capital.

The steam plant that had constituted the original source of the company power supply, located on Assiniboine Avenue, was permanently closed down in the spring of 1918. It dated back to 1898 or earlier and was fitted entirely with engine-type generating units, both alternating and direct current. The alternating-current units had been superseded since 1911 by a modern turbine power station which relays the hydro-electric system that has supplied nearly all the company's power since 1906. The old direct-current steam units had since been used only on rare occasions, such as heavy blizzards.

The engine-type direct-current generators comprised one 850- and two 400-kw. machines, the latter shown in an accompanying illustration in their original condition in the old generating station. The former ran at 85 r.p.m. and the two smaller machines at 100 r.p.m. Among the engine-type alternators there were two 800-kw. machines operating at 90 r.p.m. The fact that the speeds of the direct-current units were so near those of the alternating-current units immediately suggested the possibility of yoking them up together, with one 800-kw. alternator driving the 850-kw. railway generator, and the other 800-kw. alternator driving the two 400-kw. generators as a three-unit machine. There was no doubt that an 85-r.p.m. railway machine would generate 575 to 600 volts when run at 90 r.p.m., and a test performed for the purpose showed that each of the 400-kw. railway machines could generate 575 volts at 90 r.p.m. With these facts established, it appeared feasible to create an addition to the motor-generator equipment of the company to the extent of at least 1,600 nominal kilowatts out of equipment on hand. The engineering problem was thus reduced to the mechanical design and assembly of these machines as motor-generators, on suitable shafts and bearings. The new substation at St. Boniface was then being constructed, and provision was being made for space for a railway motor-generator to take care of the trolley lines east of the Red River. It was thought worth while to reconstruct a three-unit machine for the substation out of the two 400-kw. generators and one 800-kw. alternator.

The old engines on which the two 400-kw. machines were mounted were of the cross-compound Corliss type. One of them was of so old a pattern that the engine frames and the pillow blocks were in separate pieces bolted together, and this suggested utilizing the two engine pillow blocks as the center bearings of the three-unit machine, between which the alternator would be mounted as a motor. A pattern of a ring-oiling bearing was found in a local foundry which proved to be easily adaptable for the two outboard bearings required. The shaft from the oldest Corliss engine was found to be just long enough to provide shafts for mounting the direct-current generator armatures, after being cut in half. It remained to find a suitable central shaft on which to mount the rotor of the alternator which was now to be turned into a motor. An old engine shaft was discovered at another machine shop, which was just large enough so far as its strength was concerned, though not sufficiently large in diameter to fit the hub of the alternator rotor which had been fitted to a 22-in. engine shaft. This fit was accomplished by providing a heavy cast-iron bushing, and the remaining necessary elements were two cast-steel face couplings and the necessary keys, with some smaller cast-steel bushings for filling out certain places on the generator shafts that were too small for the direct-current armature fits. How these elements were all assembled to create the newly reconstructed three-unit machine is shown in an accompanying illustration, and another view shows the finished machine operating in the substations.


RAW MATERIAL FOR REBUILT MOTOR-GENERATOR SETS

Corliss engine-driven units in the old generating station, one of two 400-kw. direct-current units in the foreground, and one 850-kw. direct-current unit in the background.

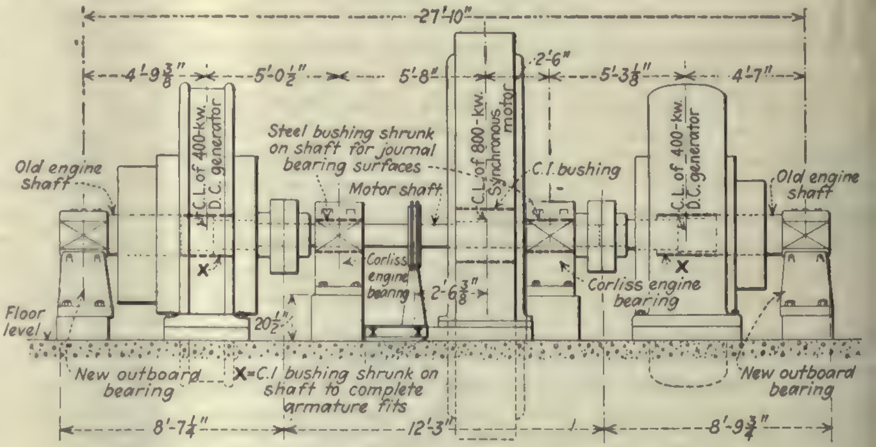
The order of operation was as follows: The flywheel of the oldest Corliss engine connected to a 400-kw. direct-current generator was taken off the shaft, the crank disks pulled off and the old engine frames separated from the pillow blocks. The armature of the generator was then pressed off the shaft, and the latter was sent to the machine shop to be cut in two, turned up for coupling seats and journals and fitted with the necessary bushings and keys for completing the altered armature fits. The other Corliss engine was of more modern design, and it was thought best to save it for possible sale, so that the shaft was dismantled, one crank disk was pulled off and the armature was removed.

When the two new armature shafts were ready they were brought back to the power plant, each with its half-coupling and the necessary keys, and the two direct-current armatures were then pressed on. Meantime the central piece of shafting was also fitted with the heavy bushing of 22 in. external diameter for the hub of the rotor of one of the 800-kw. alternators, the cast steel bushings for forming new journal bearings upon it, and the other halves of the couplings. The new outboard bearings were then completed and all the parts, bearings, shafts, armatures and fields taken to the substation and assembled. All the machine-shop operations consumed about two and one half months and the field work of mechanical and electrical assembly at the substation took about two months. The mounting of the alternator rotor upon the motor shaft was quite simple, because the rotor is built in halves bolted together and therefore did not require a press fit.

No bedplate was thought necessary for holding this machine in alignment. The stationary parts are very heavy and are bolted down to separate foundation piers which are joined together at the bottom by masses of concrete and at the top by the reinforced-concrete floor. The machine foundation piers all rest on a single concrete slab about 32 ft. long, 22 ft. wide and 1 ft. thick, reinforced with old 60-lb. rails.

The exciter for the field of the alternator is a 30-kw. slow-speed machine, which had formerly been belted through a pulley on the engine shaft. In the new substation this exciter is driven through an inclosed silent chain by a 40-hp. induction motor.

The old pillow blocks are fitted with the four-part babbitted bearings and adjusting wedges with which they were originally provided, so that close adjustment is possible. The two new outboard ring-oiling bearings are adjustable vertically by means of shims and horizontally by means of adjusting bolts.



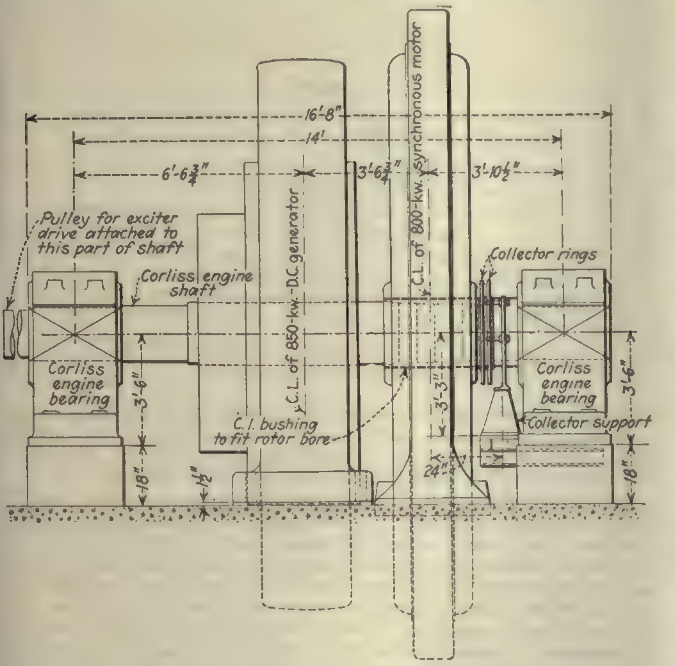
ASSEMBLY OF THREE-UNIT MOTOR-GENERATOR SET SHOWN IN ANOTHER ILLUSTRATION

The bearings of the old Corliss engine were used for center bearings, and two new bearings ordered for outboard bearings. The old Corliss engine shaft cut in two served for the two direct-current machines. A second-hand shaft was found for the alternator. Cast-iron bushings of suitable diameter were shrunk on these shafts to fit the bore of the three machines, and steel bushings were used to enlarge the shaft and provide new journal surfaces in the center bearings. Note the concrete pedestals or pads necessary to bring the bearings and machines in correct alignment.

The machine went into permanent operation about Sept. 1, 1919, and has since given very satisfactory service excepting for a period of several weeks during the summer of 1920, when one of the main pillow-block bearings burned out, owing to a failure of the lubrication.

The two generators when running in parallel operate together much better now than they ever did when they were mounted on separate steam engines in the old steam plant. Occasionally they run two-wire, but the usual operation is three-wire with the generators in series.

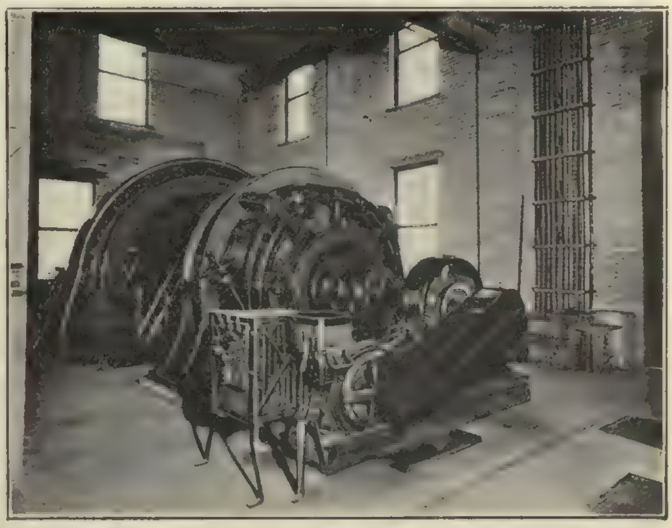
The success of this reconstructed motor-generator set was sufficiently marked to justify the conversion of the two remaining engine-type machines into a two-unit motor-generator. It was therefore decided to scrap the 1,200-hp. Corliss engine which had been driving the 850-kw. direct-current generator, excepting its armature shaft and main bearings. Careful measurement had indicated that if the flywheel, eccentrics and crank disks were removed from the engine shaft there would be just room enough in the space formerly occupied by the flywheel to mount the rotor of the second 800-kw. alternator and at the same time provide sufficient space in the pit for shifting the alternator stator to uncover either field or armature for inspection or repairs. Fortunately, this could be done without moving the heavy direct-current armature from its position on the shaft, for it is about 10 ft. in diameter, weighs something like 36 tons and had required a force estimated at 400 tons to press it on the shaft. The shaft and bearings being therefore on hand and all made to size, the mechanical operations were simple and consisted in cutting away all unnecessary metal from the heavy cast-iron engine-frame housings in which the main pillow-block bearings were set; taking off the 50-ton flywheel with the eccentrics and crank disks; cutting a new keyway for the hub of the alternator rotor; providing a cast-iron bushing of about 22 in. inside and 24 in. outside diameter and long enough to carry the rotor hub and the collector rings, and a suitable bushing to fit on the external shoulder formerly occupied by one of the crank disks, where it was decided to mount the 60-in. pulley for the belt drive to the exciter. The remainder of the engine was sold for junk.



ASSEMBLY OF TWO-UNIT 800-KW. MOTOR-GENERATOR SET SHOWN IN ANOTHER ILLUSTRATION HEREWITH

The 850-kw. direct-current generator, its shaft and bearings were left untouched. The flywheel and other parts of the Corliss engine were removed from the shaft and replaced by the rotor of one of the 800-kw. alternators, with a suitable cast-iron bushing to fit the rotor bore. Note the concrete pedestals or pads necessary to bring the direct-current machine and the bearings in the correct alignment, while the alternator feet were dropped slightly below the floor level for this purpose.

The layout of this assembly, excepting the exciter drive, is shown in one of the illustrations herewith, and another shows the complete unit including the exciter. No electrical changes were made on the generator. This machine, as well as the three-unit set, is started from the direct-current end. Work on it was started Feb. 1, 1920, and the rebuilt machine was ready to turn over early in July. It went into regular operation in October, 1920.



REBUILT TWO-UNIT 800-KW. MOTOR-GENERATOR SET

Built up from the 850-kw. direct-current generator visible in background of another illustration herewith, and from one 800-kw. engine-type alternator serving as a synchronous motor.

As in the case of the first reconstructed machine, the only trouble that developed was in the bearings, one of which had a crack in the babbitt of the lower portion, inherited from its steam-driven service, and after several ineffectual attempts to remedy this, the bearing was rebabbitted. There was some further trouble from oil throwing as the shaft was of sufficiently large diameter to make its peripheral velocity greater than in the case of the first machine, where this trouble had not developed. This was finally overcome by the addition of disks inclosed in sheet-metal guards.

Electrically, both these reconstructed motor-generator sets operate perfectly. Mechanically, there are only two or three elements that would be changed if the work had to be done over again. In the case of the three-unit machine it would have been better to have provided cast-iron sole plates about 15 in. deep underneath the two center bearings so designed that they could be readily withdrawn from underneath the pillow blocks, in order to permit the lowering of the pillow blocks when any repairs were required on the center bearings, as this would save the trouble of uncoupling the motor shaft and lifting it out of the center bearings at such a time. It would also have been better to have designed a modern lubricating system for the old engine bearings on both machines, prior to the construction, including the oil-throwing disks required for the 22-in. shaft.

The original cost of the five old generators purchased between 1898 and 1905 was about $93,000. An engineering appraisal of the property made in 1915 had set the present value of these machines at about $41,000, but at the time the steam plant was ordered discontinued these generators were regarded as obsolete. The cost of reconstructing them and setting them in operation, as described, exclusive of foundations, was about $31,000 for labor and material on a war-time basis. In pre-war days the same work would probably not have cost more than $18,000.

Quotations on new motor-generator equipments in 1918 were on the basis of more than $40 per kilowatt at the factory, or say $45 per kilowatt erected in Winnipeg, which would have amounted to about $72,000 of new capital for 1,600 nominal kilowatts. The construction herein described is therefore believed to have saved the railway company more than $40,000 and prevented what would otherwise have been a deliberate waste of valuable equipment, for these machines have proved their title to a new lease of life and are able to render the same service they did twenty years ago.

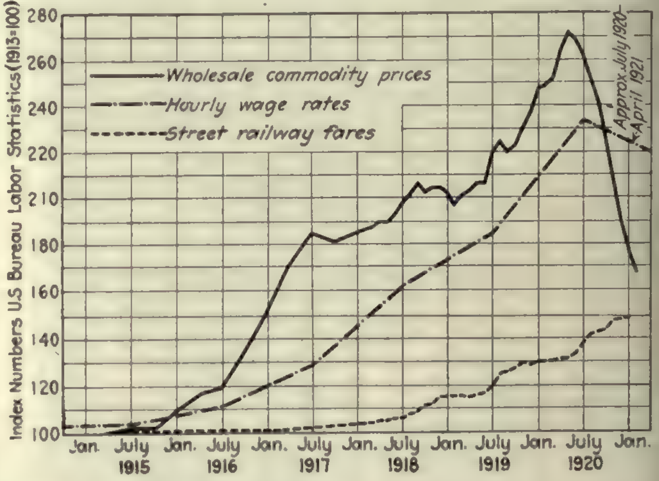
# Impairing and Repairing Street Railway Rates

### Owing to the Increase in Commodity Prices the Nickel Fare in 1914 Had Already Become Too Small—Decreases Not Now Possible Until Balance Is Reattained

WALTER H. BURKE has contributed an interesting article on street railway rates to the June number of Stone & Webster *Journal*. At the beginning of this article he points out that even before the war a great many city railway companies could no longer make both ends meet on the universal 5-cent fare. This was the cause of the gradual but steady increase in commodity prices and wages which began in 1896. Statistics of the United States Bureau of Labor show that wholesale commodity prices, rated at 66 in 1896, had advanced to 100 in 1913. Average hourly wages also had increased during the same period from 69 to 100. On the other hand, street railway fares on the whole had decreased during the period, due to various factors, including the extension of the use of free transfers, the sale of tickets at reduced rates, etc. Thus, the beginning of the war found the industry as a whole like a man, already in poor health, who suddenly contracts an acute illness.

The condition since 1914 is shown by the chart. The index numbers for commodity prices and of wages in this chart are from publications of the United States Bureau of Labor Statistics. The fares are an average for all cities in the United States of more than 50,000 population except New York City and are weighted according to population. The data on fares were prepared by Prof. A. S. Richey. The latter portion of Mr. Burke's article, considerably abstracted, follows:

> The point to be particularly noted from the chart is the lag between railway fares and other prices, no appreciable increase having been shown in the former until the middle of 1918, *i.e.*, a few months before the close of the war, whereas commodity prices had practically doubled in the meantime, and the hourly wage rate had advanced some 65 per cent. This in a nutshell was the trouble with the street railway situation.
>
> The future trend of prices is uncertain, but economists quite generally agree that for a number of years at least the average will be from 50 to 60 per cent above pre-war figures.
>
> Assuming a 50 per cent higher price level for the future, it is evident from the chart that street railway fares, even with the increases of the past few years, still are short of what they should be to meet the permanently changed conditions. This, however, takes no account of the tremendous discrepancies of the past five years between the prices of street railway transportation and those of other commodities and of labor. This is a disparity which must be compensated for in the long run if the companies are to go along on a comparable basis with other industries. The fact must not be lost sight of that while the increases in fares of the past few years or so have helped conditions, they have by no means repaired the damage which resulted from failure to allow this relief more promptly. This can be accomplished only by continuing the increases in force for such period in the future as may be necessary.
>
> The under-development of the properties during recent years, in the face of the rapid and continued growth of the communities served, means that, in addition to refunding their short-term obligations, a tremendous amount of new money will be required to bring them back to pre-war standards of development and enable them to keep pace with future city growth. What rate of interest the street railways must pay to get this money can only be guessed at. If, as generally agreed, from 7 to 8 per cent was the minimum fair return for the public utilities before the war, and if we are now to find ourselves on a 50 per cent higher price level than at that time, then, to use a rough yardstick, the fair rate of return becomes at least 10½ to 12 per cent.
>
> The above situation is emphasized because recently there has been some scattered sentiment in favor of reducing existing fares on the general theory that "the price of everything else is coming down and the street railways should take their medicine along with the rest of us." It is only necessary to refer again to the accompanying chart to show that for several years past the street railways have been "taking their medicine" in double doses at a time when other business has been getting the largest profits in its history. It is just now approaching what might be termed the convalescent stage of its illness. It would have been to the best interests of all concerned if, beginning in 1916, street railway fares had more nearly kept pace with the increases in other commodity prices and wages. Unfortunately, this policy was not followed, and the penalty is the continuance of higher prices for a longer period than would otherwise have been necessary, assuming that the street railways are to function and meet the needs of the public for adequate and dependable transportation service.



RELATIVE INCREASES IN WHOLESALE COMMODITY PRICES, HOURLY WAGES AND STREET RAILWAY FARES

> Nevertheless, there are a great many encouraging factors in the present outlook. The fundamental soundness of the business has been proved without doubt. There are few if any other industries which could have withstood such a test as the street railways have had to face during the past five or six years. The companies have no large inventories, carried on their books at inflated war prices, which must be liquidated. Again, while the street railways have been forced to suspend practically all new development work for five years past, their new construction work of the future will require a substantially smaller capital expenditure than would have been the case under war conditions. The war has naturally stimulated previous efforts to effect economies in operation, like the Birney car. Finally, the general public is coming to appreciate that the street railway fills a vital need because it furnishes a service which the cities cannot do without. As a result of the companies' efforts a great many of their patrons now own securities in the properties, and this is one of the most effective means of securing and holding the public interest. The regulatory authorities also are devoting their efforts to a correct solution of the problem; the same is generally true of the press. It is this co-operation which will accomplish more than anything else toward working out the street railway situation on a permanently sound and satisfactory basis, fair alike to the public and to the companies.

# Public Service Railway Offers Valuation Argument

### Extensive Brief Which Is Presented to the New Jersey Board of Public Utility Commissioners Gives All Details on Which a Value of $200,898,906 Is Claimed and 10-Cent Fare Petitioned

IN ONE of the most complete valuation briefs which have so far made their appearance, the Public Service Railway of New Jersey presents its argument to the New Jersey Board of Public Utility Commissioners to support its own figure of valuation and its petition for a 10-cent fare. The brief contains a complete review of the total valuation history of the Public Service Railway, giving all details of previous valuation, and it is replete with arguments, some of them novel but convincing, to support contentions for various elements of value.

Commencing with a description of the Public Service Railway property, the brief then takes up the argument that the property is private property and on this has to say:

> The reason for here stating them (these arguments) is simply to plant upon them the further proposition that the value for rate purposes of a street railway property—the same being private property—must be determined in accordance with established legal principles, and is the value of the property and not merely a sum of money, on which, in the discretionary opinion of the commission, the owner of the property should be permitted a return.

The various elements of value which the brief considers are:

1. Structural value.
2. Value of the land.
3. Going value, which includes:
   a. Development costs including:
      a1. Money expended in attaching the business.
      a2. Money expended in tuning up the property.
      a3. Carrying charges until the property becomes self-supporting, including deficit of earnings.
   b. Consolidation of a number of small properties into one property under one management.
   c. Superseded property due to advance in the art, obsolescence, inadequacy, etc.
   d. The value imparted to the property by reason of its favorable location, referred to by the court as its adventitious value.
4. Value of the power contract (discussed under a separate heading).

Considerable attention is paid to the item "Going value," for which an allowance of 30 per cent of the physical value is claimed. In connection with the element of going value due to consolidation of the smaller properties, the brief has to say:

> The properties necessarily purchased or leased to effect this consolidation were not so purchased or leased at the cost of their physical parts. Their "going value" was recognized and it entered into the price which this company paid for them. This cost of consolidation was a cost necessary to the creation of the existing railway, and it added largely to the value of the property which is to be determined in this proceeding.

Superseded property and attaching business to the lines of the company are also supported by argument. The cost of training a staff to make it familiar with the needs of the communities served and conversant with the routes and rules of the company, the rules of the commission, the traffic rules and ordinances of the communities and the various intimate details of operation that come only from experience and practice and in the perfection of the company's personnel in the knowledge of its duties is portrayed. The report says "an example of the nature of this cost is found again in the fact that prior to the putting in service of the so-called safety cars, trainmen were given five days' course of actual operation on cars that were not transporting a single paying passenger. Through the year with its frequent changes in both means and methods of operation, this cost has enlarged, and there is nothing to show for it in the physical property inventory. It is a part of the cost of the present railway, and its results constitute an element of value in that railway."

The power contract, as a separate element of value, is supported in the same manner that it was supported in the appraisal made by Ford, Bacon & Davis outlined in ELECTRIC RAILWAY JOURNAL April 23, 1921, page 767. The state valuation and the Cooley appraisal are reviewed. An argument of the significance of present value is followed by a summary of all the valuations which have ever been made of the property, with some of these modified to make them represent present-day figures.

The brief goes into detail in discussion of the qualifications of the various witnesses who have appeared before the board in connection with the valuations which have been made.

The inventory, unit prices, general contingencies, engineering and superintendence, law expenditures and administration, interest during construction, taxes during construction, organization and development, cost of money, promoters' remuneration, working capital and material and supplies, franchises, land, non-deduction of depreciation, the property of miscellaneous subsidiary companies, historical costs, are all chapter headings under which extensive argument and citation of cases are given. This leads the brief to the statement of the value of the property as follows:

> The value of the property of the Public Service Railway fixed in the report of the engineering concern (Ford, Bacon & Davis) employed by the state is $125,000,000, and under the acts of the Legislature this is the presumptive value of the property.
>
> The only evidence before the board that can possibly overcome the legal presumption in favor of $125,000,000 is the Cooley appraisal, as brought down to date, and the testimony of the numerous expert witnesses sustaining and supporting the same.
>
> The value of the property of the Public Service Railway is:

| | |
|---|---|
| Physical property with additions to May 31, 1921 (Cooley appraisal) | $149,922,236 |
| Development cost, going value, including location and consolidation values (30 per cent of structural cost, as allowed in the Passaic gas rate case) | 44,976,670 |
| Value of power contract (the lowest value placed upon it by any witness) | 6,000,000 |
| Total value | $200,898,906 |

The brief then points out that the value of the property must be found independently of the rate of fare and allow the return upon the value of the property as found. "This does not mean," says the brief, "that this company should necessarily be permitted to charge the highest rate that the traffic will bear. We are now only discussing the relation between the value of the property and the rate of fare and pointing out that the value of this property cannot be reduced because there is no rate that will net a return upon it. . . . We suppose that the New York subway constructed out in the country somewhere between two small places would be so expensive that no rate of fare would net a return upon it. But that is not this situation. This property is not overbuilt. It is not constructed in the Sahara Desert; it is right here in New Jersey, connecting the principal cities of the state and furnishing the only complete system of urban transportation available in all these great populous centers."

The brief ends with a plea for a just and reasonable fare and recites various cities in the country in which a 10-cent fare is charged and gives supporting testimony from officers of other railway companies which charge 10 cents. In the discussion on rate of fare, the brief takes up the claim of people that the company has valuable rights because it is allowed to do business in the streets. The brief continues:

> It is just as sensible to talk about the valuable rights of the policeman because he is allowed to perform his service to the public in the street, or the fireman because he is allowed to perform his services in public places. The policeman and the fireman perform honorably and are paid for their labor by the public, notwithstanding the fact that such labor is performed in the public streets. The street railway company also performs a valuable service in the public streets, and it should be paid for its service, notwithstanding the fact that it is performed in the streets. That is all the company seeks to obtain in this case, and yet the idea is continually advanced that perhaps the company ought not to be paid or ought to be paid less because of this valuable "privilege" it enjoys.

The entire brief is filled with innumerable citations from court and commission decisions and with many direct quotations from the testimony of witnesses before the board.

## Letter to the Editors

### *Why Baltimore Departed from the Standard Car*

UNITED RAILWAYS & ELECTRIC COMPANY
BALTIMORE, MD., July 11, 1921.

To the Editors:

The letter published in your issue of June 11 from W. G. Gove, superintendent of equipment, Brooklyn Rapid Transit Company, it seems to me, merits comment, because it fails to recognize the fact that more than one type of one-man car is required because of traffic conditions.

To quote the first phrase in the third paragraph, "it is particularly unfortunate" that the idea of "something different" should be allowed to confuse the need for clear vision on the part of the operating men to develop such types of one-man cars as are essential to meet varying traffic demands.

In the study and discussion that are going on concerning one-man car design, I do not think that those "in responsible charge of executive and operating departments" are concerned with "measuring up" by means of having equipment of their own design in service on their properties. Certainly as far as the situation in Baltimore is concerned, we have conscientiously studied the problem with the idea of providing a car best suited to handle heavy interchange traffic in this city.

If we are to "sell" the one-man car idea in toto in the large cities, we must do so by providing a car that will give adequate facilities for the loading and unloading of passengers. Why should we adhere to the present standard car if improvements can be made? Is it not inconceivable that we have reached a stage of development where initiative on the subject of car design is to stop? This is particularly true where a principle of operation is concerned.

May I repeat again that I am not desirous of entering into a controversy in the matter but endeavored dispassionately to point out what I felt and feel was a development in the design of this car which has been overlooked by the manufacturers and equipment men in their efforts to standardize on a single type of car.

We believe that the car we have just purchased for Baltimore will give higher efficiency and greater economy than the so-called standard type for the conditions we have to meet. As our general manager has recently well stated, the problem before us was that "the public of Baltimore was beginning to show a decided dislike to the safety car on account of the congestion at the entrance and exit point." Appreciating the value of the one-man idea, we decided to correct this manifestly incorrect design. At this point we suggest turning to the cut on the inside back cover of the ELECTRIC RAILWAY JOURNAL of July 2, 1921; we think the picture is a good ocular demonstration of just what we are trying to avoid. Here are four persons encumbered with luggage, etc., waiting to board a standard one-man car, while four passengers are ambling gracefully off. This condition is much worse in rainy weather. It is just what we are overcoming in our new design.

And now a final word in reply to my friend Walker's letter of June 15. The standard whereby car design with reference to passenger interchange facilities should be measured is not in cents per car-mile but in the volume of passenger movements in and out of the car. On a line where traffic is heavy and frequent transferring is the rule car-mile earnings do not express the density of use by the public, so that an erroneous conclusion might well be arrived at in setting a standard based on earnings per car-mile.

The proper way to determine what is the best design for given conditions is to put the several types of cars in service under identical conditions and take observations with stop watches, over a sufficient period of time to get average conditions and data, and then compare results. Any other method of arriving at a descision will not be based upon figures and results but upon judgment and opinion.

L. H. PALMER,
Assistant to President.

## Metal Ceiling Used for Head Lining on Little Rock Railway

The Little Rock Railway & Light Company, Little Rock, Ark., is using metal ceiling for head lining in repairing and rebuilding some of its cars, where the head lining needs renewal. The metal ceiling, which is the same as used in buildings, comes in 24 in. x 48 in. sheets, and the metal for one car costs about $12. Labor and painting cost about $18. This total cost of $30 compares most favorably with the previous cost of $100 for replacing bird's-eye lining in kind, and the car interior presents a very satisfactory appearance.

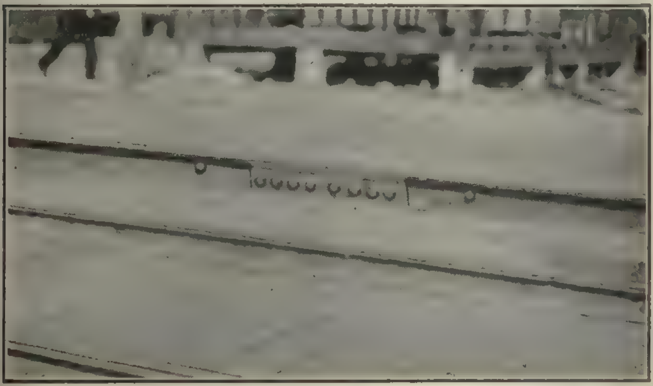
# Equipment and Its Maintenance

*Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments*

## Tracks Rebuilt on Old Ties

**Creosoted Ties Set in Concrete Thirteen Years Ago Used in Place for New Rail—City Raises Street Grade 2 In. to Allow New 7-In. Rail in Place of 5-In. to Avoid Disturbing Base**

WHEN the city of Memphis, Tenn., decided to repave South Florida Avenue it became necessary for the Memphis Street Railway to relay its tracks at the same time that it did its part of the paving. The old track had been 5-in. girder, which had been in place since 1908 and was badly worn. The previous paving had been brick and the new paving was to be asphalt. The standard construction of the Memphis system is now 7-in., 105-lb. girder rail for use in asphalt paved streets, and it was decided to use this rail on Florida Avenue.



Thirteen-Year Old Creosoted Ties in Concrete To Receive New Rail

When the old pavement was taken up and the original concrete base and ties uncovered it was found, upon close examination and test by boring, that the original ties were in as good condition as they were when first laid, so far as could be told. These ties were some which had been laid in 1908; they were laid in concrete which was finished off level with the upper surface of the ties. Seeing that the new rail to be put in was 7 in. in place of 5 in. the city authorities were approached with reference to raising the grade of the streets to allow the new higher rail to be put in without removing the concrete foundation and ties, which of course would prove very expensive. It happened that the raising of the grade was beneficial to the city in this case, also, as a particularly high curb had been installed in the first place, and when the grade of the street was raised a normal height of curb was obtained. More material in street paving was used, but it is understood that the electric railway took care of this part as an offset to its saving in not having to take up the old ties and put down new ones.

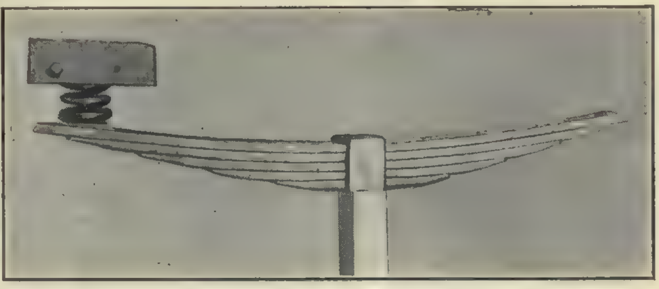
Accordingly, the pavement in the railway area was removed and track labor cleared off the concrete, leveling down to the ties smoothly, the old rail was removed and the new rail installed. Temporary crossovers were laid so that one-half of the street was done at a time. An accompanying illustration shows the appearance of the work after the rail and pavement had been laid on one side and the pavement removed on the other side. This illustration also shows the type of 8-hole joint used on the new construction.

The standard construction used in laying the new rail is to use tie plates on all ties and to use a 26-in. by 10-in. base plate under all joints. A 34-in. 8-hole angle bar is used and this is beaded along the bottom of the plate. The rail is welded to the base plate for the entire length of the base plate, a Cleveland electric welder being used for this work. Screw spikes are used at joints and cut spikes elsewhere.

## Improving Riding Qualities

THE Southern Public Utilities Company, Charlotte, N. C., is an enthusiastic operator of one-man cars. claiming that they show reduced operating expenses and allow closer headways and consequently better service. During part of the day, however, these cars operate under light load, but being equipped with springs which are rigid enough to carry heavy loads successfully and heavy enough not to break under such loads, the riding qualities are not exceptionally good when they are lightly loaded.

In an effort to improve the riding qualities of the one-man cars under this condition M. F. Osborne, master mechanic, decided to install a coil spring at each body bearing point, which coil spring would carry the body at light load and would compress so as to allow the semi-elliptical spring alone to carry the body at heavy load. The Charlotte cars are arranged so that the inner end of the semi-elliptical spring is fixed and the car body borne at the four outer ends of the springs. The body formerly rested at these points on blocks of wood 4 in. thick and about 8 in. square, which in turn rested directly upon the free outer end of the springs. To install the coil springs these blocks were reduced in thickness to 3 in., a 5½-in. hole bored in each of them and a coil spring 5 in. long, consisting of five turns of ⅞-in.



Coil Spring Added to Semi-Elliptical Spring wire, placed in this hole and fitted with spring caps, which provide the actual bearing surface. The 2-in. play thus allowed is sufficient for all light loadings of the car and when the car is fully loaded the spring compresses so that the blocks come in contact with the heavier semi-elliptical springs, which thereby assume the load direct.

The improvement in the riding quality is said to have been so great that, unsolicited, patrons of the road have inquired what has been done to certain cars to make them ride better.

An accompanying illustration shows the spring arrangement which Mr. Osborne is now using.

## Reclamation Department Shows Large Savings

**New Welding Shop and Reclamation Department Installed by Washington Railway & Electric Company Provide Better Facilities for Carrying on This Work—Accurate Cost Records for Work Done Are Being Kept**

ON ACCOUNT of the rapid increase in the amount of reclamation work necessary at the shops of the Washington Railway & Electric Company, it was decided some months ago to build a larger shop to house the electric welding equipment. The interior of the new shop is shown in the accompanying illustration. It is an addition to the main shop, 34 ft. long by 18 ft. wide, built of brick and well lighted on three sides. The floor is of cement and the roof of galvanized iron provided with large ventilators. An overhead track carries a 1½-ton chain hoist for use in handling heavy parts. Convenient benches, racks, etc., together with the welding equipment, are included.

For electric welding a Wilson "plastic arc" machine that will accommodate two welders is used. In the construction of the building additional room is provided so that additional machines can be added should future needs make them necessary. Since the installation of this machine an accurate cost record has been kept for every job done in the shops and a recapitulation for the first three months of the shop's operation shows a net saving of approximately $2,000 per month with two operators working. Since that time new and different kinds of work have been constantly coming in and it has now been found necessary to increase the working force. Electric welds are made on steel, cast and wrought iron, bronze and malleable iron. In welding cast iron the parts are carefully studded with steel pins before the welding work is undertaken.

At the present time the company is testing out a special metal which has been developed by the Wilson Welder & Metals Company for cast-iron welding. On small sections of cast iron and brass the oxyacetylene method of welding is used, which is found preferable by this company and more satisfactory for these small jobs. The oxyacetylene torch is also used almost entirely for cutting.

A partial list of some of the work being done in reclaiming various parts includes building up axles and armature shafts, repair of truck frames when broken or badly worn, filling in dowel holes in brass and malleable axle-bearing shells when badly worn, building up and welding brushholders when burnt or excessively worn, filling in armature-housing bolt-holes where the threads have stripped, repairing journal boxes and axle-bearing caps, welding and straightening resistance grids when broken or warped, building up axle-bearing collars on brass shells, welding and repairing gear cases and adding metal for rethreading bolts, nuts, center bearings, motor cases, etc.

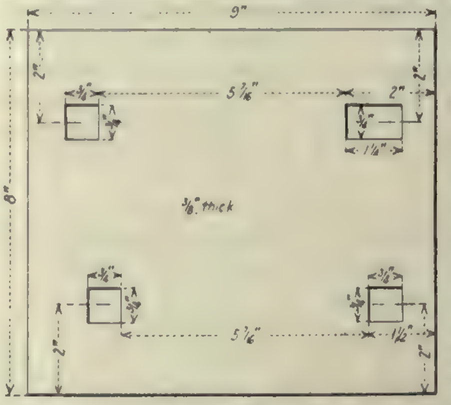
It is frequently desirable to build up or repair parts which cannot be easily transported to the welding shop. In order to take care of this work, leads have been provided from the welding machine with plug-in sockets in the truck shop, carpenter shop, etc. By this arrangement welding of large parts can be conveniently taken care of on the job, and the removal and transporting of the large parts to the welding room is avoided.

INTERIOR OF NEW RECLAMATION SHOP IN WASHINGTON

At present consideration is being given to the purchase of an automatic welding machine complete with a single-arc motor-generator. This outfit when attached to a lathe will automatically build up axles with worn bearing seats, as well as worn armature shafts, and will, in the opinion of the officials of this road, do much better and cheaper work than can be done by hand operation.

## A Universal Tie Plate

THE Georgia Railway & Power Company, Atlanta, Ga., uses steel tie plates in all of its construction. Formerly three kinds of tie plates were used to suit the various kinds of rail on the system. The usual difficulties incident to a variety of tie plates, both in the storeroom and on the job, led the company to desire a single tie plate which could be used and, finding none with a spacing of holes which was exactly suitable to its conditions, designed one to fit them. The accompanying drawing shows the dimensions of the new tie plate, which of course can be furnished by any steel concern, with which any rail 5 in., 5½ in., 6 in. can be used. There are no shoulders on this tie plate, it being a plain piece of steel punched as indicated.



UNIVERSAL TIE PLATE USED IN ATLANTA

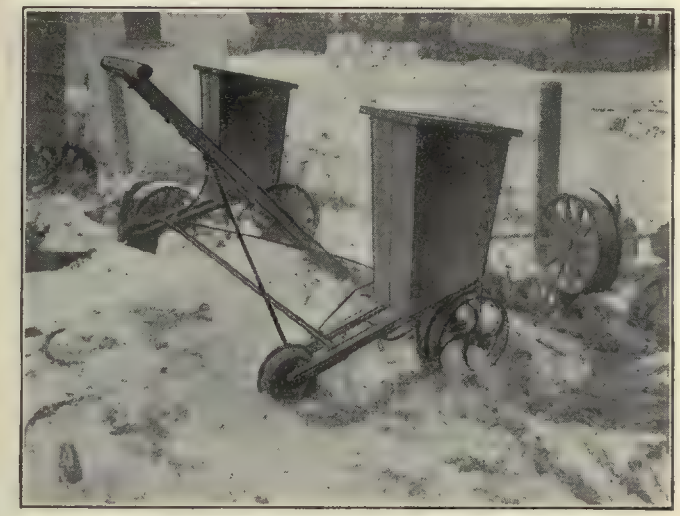
# Shop Notes from Newark, N. Y.

**Rochester & Syracuse Electric Railroad Has Well-Equipped Shops Where Many "Stunts" for Solving Maintenance Problems Have Been Developed**

THE shops of the Rochester & Syracuse Electric Railroad, the offices of which are at Syracuse, N. Y., are at Newark, about 32 miles east of Rochester. Due to the destruction of its Newark shops by fire in 1912 the Rochester, Syracuse & Eastern Railroad, the predecessor of the present company, had the opportunity to rebuild along modern lines. New shops, similar in general plan to the then new Lakeland shops of the company near Syracuse, were constructed early the following year. They were described briefly in an article in the issue of this paper for Sept. 20, 1913, where a plan was reproduced. The views grouped on this page are typical.

These shops have proved to be admirably adapted to the demands upon them and no important changes have since been made. A number of minor improvements have, however, been introduced. Several of these were photographed by a representative of the paper on a visit to Newark several months ago.

The shop property comprises a shop building, approximately 204 ft. by 105 ft.; a carhouse about 240 ft. by 82 ft., and a two-story office building. Most of the shop work is done in one large room, which contains practically all of the machines and has three tracks at one side, two of which are partly over pits. On the side of the pits the floor is depressed 18 in. to facilitate inspection and repair work without unnecessary stooping on the part of the workmen.



THIS MACHINE SIMULTANEOUSLY SANDS BOTH RAILS

The shop is liberally equipped with labor-saving devices, such as a trolley crane, transfer table, turntable, etc.

For dipping and baking purposes, a combined tank and oven has been constructed in one corner of the machine and erecting shop, as illustrated, being built out of concrete blocks. Over the dipping and baking sections are metal-covered wood lids. A trolley crane bar runs over the two. The oven is heated by means of electric heaters, controlled by snap switches located on the wall behind the oven and visible in the picture.

The shop contains no special welding room, but apparatus is taken as required to the work. A convenient

NO. 1—ONE OF THE BIG INTERURBANS IN FRONT OF THE MAIN SHOP. NO. 2—THE SHOP ADMINISTRATION BUILDING IS ATTRACTIVE. NO. 3—A HOME-MADE SELF-CONTAINED OIL HEATER. NO. 4—TYPICAL VIEW IN THE NEWARK SHOPS

A REMINISCENCE OF THE SEASON OF HEAVY SNOW

THESE SHELTERS MITIGATE THE RIGORS OF WINTER

two-wheel truck for carrying a pair of gas tanks has been constructed and has given a good account of itself. As shown in one of the illustrations, it consists of a light steel frame, normally vertical, to which the tanks are held by a steel strap clamp, the weight being taken on a platform just above floor level. A ½-in. steel rod attached to the front of the platform on each side is bent backward to form an extra guide for the tanks and also a handle bar.

For heating soldering irons and solder pots, a home-made oil torch is employed. A frame such as is used with gasoline solder pots is mounted on the top of an air tank, a supply of oil is poured into the air tank and air pressure is pumped up to 60 lb. or so. The oil jet spurts up through a carbureting cylinder, where it is vaporized and ignited. One pumping up of the tank lasts for several days of intermittent work. The outfit is shown in one of the illustrations, in use for heating soldering irons for armature banding.

An interesting small job recently put through the shop was the construction of portable shelters for the use of flagmen and others obliged to be out on the line during severe weather. A picture of a pair of these is reproduced. The shelter is made in sections which hook together, four sides, a roof and a floor. Electric heaters are provided to be used in very severe weather. The roof has a frame around the edges which drops over the sides, thus making a watertight joint. The only window provided is in the door. A shelter like this can be taken apart, loaded on any kind of a work car, freight car or truck and quickly transported to the place needed and set up.

As the pictures indicate the writer's visit was made before the snow left the ground. He was able to snap one of the big snowplows used by the railway, alongside the carhouse. An interesting device seen in the shop yards, also, was a track-sanding apparatus, consisting of two sand boxes, mounted on a light truck, with a handle bar to assist in propelling it along the track. This equipment permits the rapid sanding of a stretch of track where there is not enough work to be done to warrant the use of a regular sand car.

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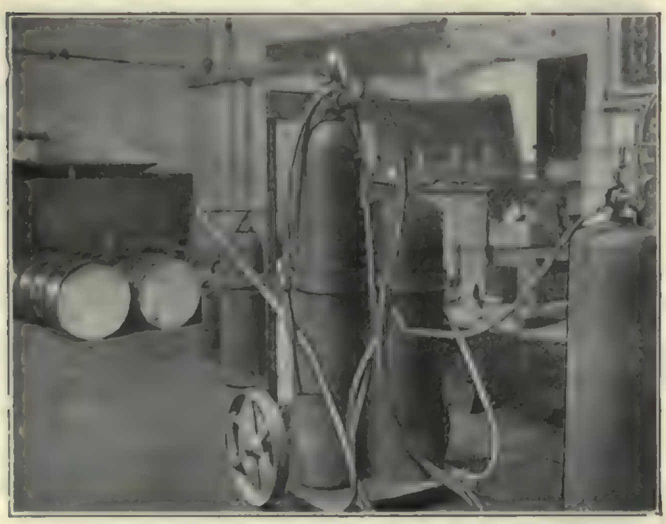
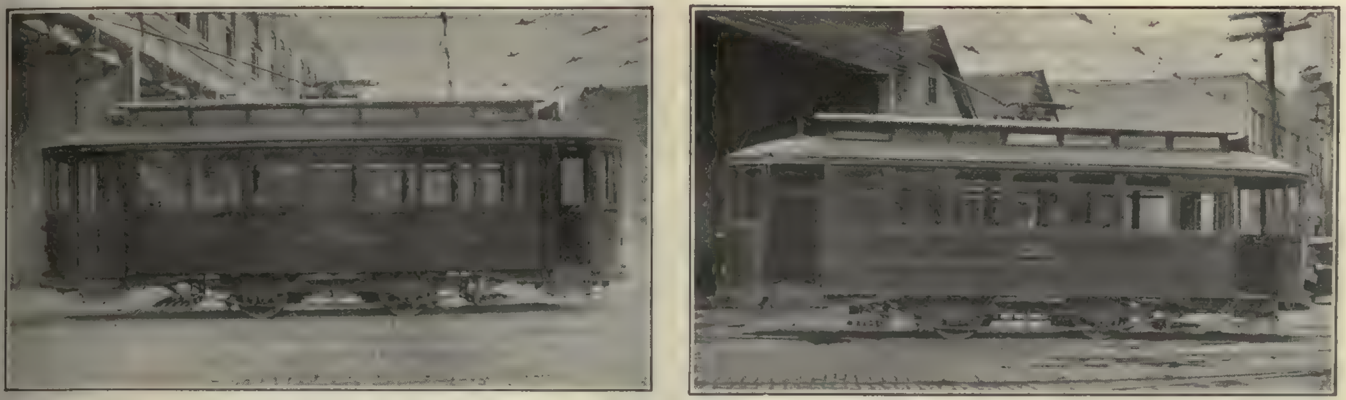
The Jamaica government two years ago voted 1,000 pounds sterling for investigations of the possibility of the electrification of the government railway, according to the issue of *Commerce Reports* for May 25. This forms the only means of transportation across the island, either for passengers or for freight, except by truck and wagon on the public roads. The lines have a total mileage of 197. Since this railroad is entirely dependent upon imported coal, which is very expensive there, the authorities have desired to make use of the water power on the island. Experts from both American and English companies have made investigations and formed estimates for the needed equipment.


PORTABLE GAS WELDING AND CUTTING OUTFIT

DIPPING AND BAKING CORNER



ATLANTA SINGLE-TRUCK CAR BEFORE AND AFTER REMODELING TO INTRODUCE P.A.Y.E. FEATURE

## Remodels Single-Truck Cars

WITH about 163 single-truck, twenty-eight seat two-man cars on its hands, the Georgia Railway & Power Company, Atlanta, Ga., has been studying the best manner of applying these cars to the service requirements. They are all of one type, with open platforms and bulkhead doors and thus arranged only for inside fare collection.

The Atlanta management has not yet decided to make use of the one-man car principle, but did want to install the pay-as-you-enter feature as far as possible. At first it was decided to remodel one car only as an experiment and the following changes were made: The doors in the bulkhead were taken out and a stanchion placed at each side of the opening thus left in the bulkhead; folding doors and steps were installed on each side of each platform, the cars being arranged for double-end operation; a guard rail about 30 in. long was placed on the platform in front of the conductor's position, to assist in guiding passengers as they passed in paying fare. This experiment was closely watched by the management to see if it gave an answer as to the economical use of these single-truck cars. There was no doubt that the P.A.Y.E. feature greatly assisted in speeding up the schedule and in making operation more attractive. In fact many trainmen soon made application for the run on which this remodeled car was used.

The experiment proved so successful that the management has started on a program of changing over all the rest of the 163 cars. By July 1 some 35 were remodeled and in operation and others were being closed up at the rate of one per day.

The only new equipments necessary are the door and step mechanisms which are furnished by the McGuire-Cummings Manufacturing Company, Chicago. The total cost of changing these cars as described is about $225 per car.

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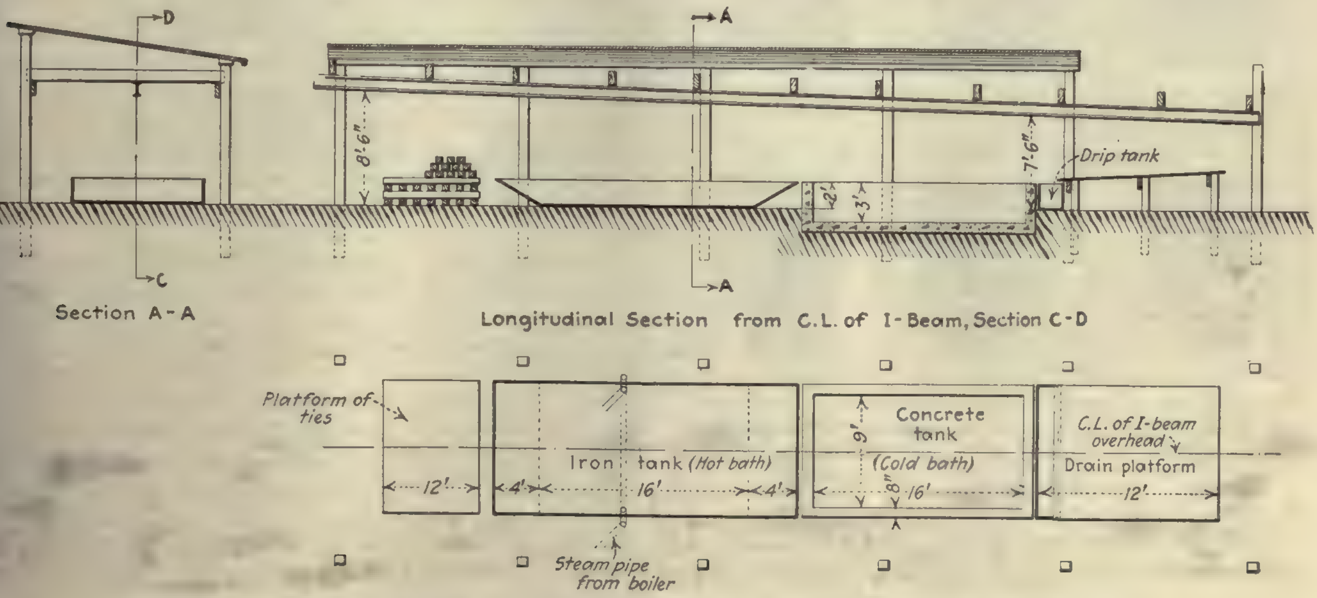
## Chattanooga's Successful Creosote Plant

**Hot and Cold Tank Application of Creosote Gives 1¼ Gal. Penetration per Tie—Ties Handled by Angle-Iron Swing Basket**

THE way engineering department of the Chattanooga Railway & Light Company has been having very satisfactory results from its creosote plant, which has been running for about a year. It is a plant operated on the hot and cold immersion principle, and the average results on a 6-in. x 8-in. x 8-ft. red oak tie show a penetration of 1¼ gal. as against a desideratum or possible maximum of 1½ gal.

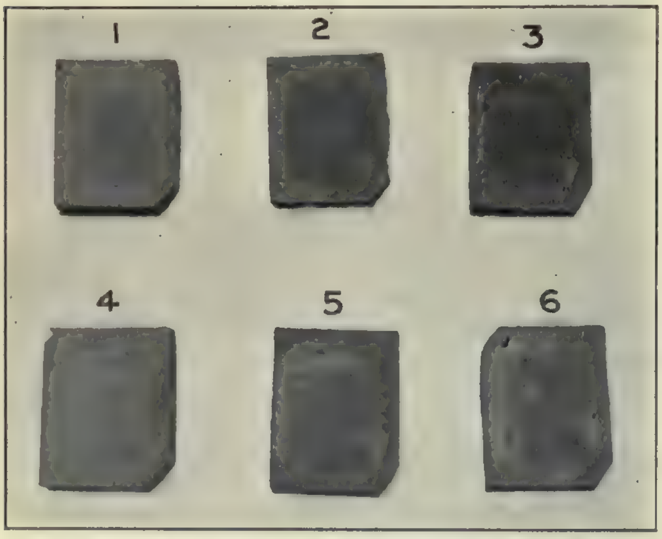
The arrangement of the plant is shown in an accompanying plan and is seen to consist of two tanks, the first a steel tank in which the hot creosote is placed and the second a concrete tank in which is the cold creosote. It is probable, however, that the steel tank will be replaced soon with a concrete tank, the steel tank being



PLAN AND ELEVATION SKETCHES OF CHATTANOOGA RAILWAY & LIGHT COMPANY'S CREOSOTE PLANT one which was left from a previous installation and was used before the present arrangement was started. One of the interesting features of this installation is the I-beam and crane and basket for the handling of the ties. As indicated on the elevation, in the accompanying sketch, there is an I-beam installed which has a 2 per cent slope in the direction in which the ties are always carried. On this I-beam is a traveling hoisting machine of 1-ton capacity made by the Brown Hoisting Machine Company of Cleveland. This is a screw-geared block and falls, from which is suspended the basket made of angle iron, shown in the accompanying view.

THE CREOSOTE PLANT IN ACTION

Seasoned red oak ties are used and are delivered at the end of the hot tank, where they are stacked. About eight ties at once can be handled in the present basket. These are then carried on the I-beam crane, which is on rollers, to the hot tank, where they are left in 150 deg. creosote for one hour. This tank is heated by means of steam coils supplied from a 5-hp. boiler, which is located at a sufficient distance to minimize the risk. The ties are then removed from the hot bath to the cold bath, where they are left for an additional hour. After coming out of this bath they are laid on the drain table, after which they are stacked and are allowed to season for at least one week before being used.



CROSS-SECTION OF ONE OF THE TIES TREATED IN CHATTANOOGA, SHOWING PENETRATION AT THE FOLLOWING DISTANCES FROM END OF TIE: NO. 1, 2 IN.; NO. 2, 4 IN.; NO. 3, 6 IN.; NO. 4, 8 IN.; NO. 5, 10 IN.; NO. 6, 12 IN.

In commenting on this plant, R. C. Morrison, engineer of maintenance of way, said that if he were rebuilding the plant he would place the I-beam 3 ft. higher than it is in the present installation in order to give more room to work with ties in the basket; that is in order to give better leverage in handling the basket up and down by means of the screw-geared block and falls, which in this case should be more rapid than the present one.

The original cost of the plant was about $600. As to operating costs, labor, the records show, figures at from 4 to 5 cents per tie, and material—carbosota—at a little more than 37½ cents per tie. Figuring interest, maintenance and material and labor, the total cost is from 45 to 50 cents per tie.

## Hardening Elliptic Springs

IN ITS shops at Rochester the New York State Railways has a convenient outfit in the corner of the blacksmith shop for heating and chilling complete halves of elliptic springs. The set of leaves forming a half spring are bunched together and heated in an oil-fired furnace, as shown in the accompanying illustration. This is built in an angle between the chimney and the shop wall, with a hood and flue connection to the chimney. Doors are provided on one end and one side.

SPRING HARDENING CORNER IN RAILWAY SHOP AT ROCHESTER

In the angle between the second side of the chimney and the second wall is the water-cooled oil quenching tank, also provided with a hood connected to the chimney to remove fumes. A simple lever mechanism facilitates the lowering of the hot spring into the oil from a distance sufficient to prevent scalding of the operator by oil or fumes.

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The Municipal Tramways at Bradford, England, have recently added to their equipment a one-man trackless trolley bus with seats for thirty passengers. The car is equipped with one motor only. Another type of trackless car recently added is a six-wheel bus with double deck. One-half of the weight is carried on the rear axle, the other being divided equally between the two front axles, which turn together for steering purposes. The principal data of this car are: Seating capacity top deck, thirty-three; lower deck, twenty-four; over-all height, 14 ft. 7 in.; outside width, 6 ft. 10 in.; total length, 23 ft. 10 in. This gives an occupancy per seat of 2.85 sq.ft. of street surface.

# Meeting of American Society for Testing Materials

## Sulphur and Phosphorus Limits Raised on Structural Steel and Steel Castings—New Specifications for Cast-Iron Wheels Presented—Tests for Insulating Varnishes Agreed Upon

THE annual meeting of the A. S. T. M. was held June 20-24 at Asbury Park, N. J. At this meeting several matters were discussed which are of interest to electric railway engineers and the following is an abstract of some of the reports and papers presented:

### STEEL SPECIFICATIONS

Action was taken regarding the extra point of phosphorus and sulphur which had been permitted in various standard specifications as a war measure. The note concerning this is now to be removed from all specifications. Recommendation, however, has been made to raise the sulphur content 0.01 per cent in the following specifications: Structural steel for locomotives, cars and ships and steel castings. In the car steel specification this applies to the structural grade only. The phosphorus content in acid steel castings is raised .01 per cent. This is for the reason that it is felt the extension in sulphur from 0.05 to 0.06 per cent in the three classes of structural steel must be retained due to the heavy tonnages involved and to the continued difficulty in obtaining low-sulphur fuels and melting stock. It will be noted that the sulphur extension will be removed on the materials which are to be worked hot and allowed on structural materials which are to be fabricated cold.

Report was made that the survey which was started last year of the effects of phosphorus and sulphur in steel is now well under way in the hands of a joint committee working under the chairmanship of the United States Bureau of Standards.

The specifications for carbon steel rails have been extensively revised as to form, at the same time clarifying the sections covering the nick and break test. Slight changes have also been made in specifications for quenched high carbon steel splice bars, quenched carbon-steel track bolts, steel track spikes, steel screw spikes, low carbon steel splice bars and quenched alloy steel track bolts. These changes relate chiefly to the manner of taking test specimens and making tests.

Similar changes were made in the specifications for structural steel for cars, carbon steel bars for railway springs, special silicon spring bars, silicon manganese bars for railway springs, chrome-vanadium spring bars, carbon steel and alloy steel forgings, quenched and tempered carbon steel axles, quenched and tempered alloy steel axles, cold rolled steel axles and steel castings.

The tentative specifications for welded and seamless steel pipe has been extensively revised and a new tentative specification was presented for carbon-steel rails with special quality requirements. These specifications are based entirely on the specifications recently adopted by the American Railway Engineering Association. This added specification is proposed for the reason that it is felt that the requirements of rail buyers are by no means uniform, and where the amount of traffic and general service conditions are more severe, a buyer might want to purchase rails subject to more rigid requirements than would be the case if the service conditions were less severe. Among other things the new specifications require that there shall be sheared from the end of the bloom formed from the top of the ingot sufficient metal to secure sound rails. Addition of aluminum to the molds is not permitted. Definite limits for carbon, manganese, phosphorus and silicon are set, and tests are required to determine ductility or toughness as opposed to brittleness and soundness. Physical qualities are determined by drop test in the standard A. R. E. A. drop testing machine, record being taken of the elongation of the rail under the blow. Test pieces which do not break under the drop test are marked and broken to determine whether the interior metal is sound. Rails are classified as No. 1 and No. 2; No. 1 being those that are free from injurious defects and flaws of all kinds. No. 2 rails are those which by reason of surface imperfections, or for other specified causes, vary from the specifications in a manner which does not impair their soundness and strength. It is permitted that No. 2 rails shall form 5 per cent of the order.

### CAST-IRON CAR WHEELS

A new proposed tentative specification for cast-iron car wheels was presented to replace the standard specifications for cast-iron car wheels. This differs somewhat from the American Railway Association (M. C. B.) standard specification and is drawn so as to cover wheels other than M. C. B. standard wheels as well as the standard wheels themselves. The new specifications are drawn up along lines which represent present-day practice in wheel foundries.

### IRON AND STEEL CHAIN

While the present specification is substantially correct with respect to test requirements, gradual changes in raw material and trade practices have made necessary a thorough revision of the section on classification and manufacture. In consequence a new proposed tentative specification was presented, in which especial attention was directed to the term "Crane Chain," which no longer represents the highest grade, the term "Dredge Chain" having superseded it. Five classes of chain are given:

Class AA for slings, cranes, hoists, steam shovels and marine uses, and where an all-iron chain is desired.

Class A for slings, cranes, hoists, steam shovels and marine use where a high quality chain is desired and sold under the trade designation "Dredge Chain."

Class B for ordinary slings and hoists and sold under the trade designation "B.B.B."

Class C for railroad cars, construction and forestry work and sold under the trade designation "B.B." or Railroad Chain.

Class D for general service and sold under the trade designation "Proof Coil" or "Common Coil Chain."

### MERCHANT BAR IRON

A new proposed tentative specification for merchant bar iron is included in the report on wrought iron, it being stated that a considerable change has taken place in the process of manufacture of some of the ordinary grades of bar iron. Small sizes of mixed scrap, thoroughly reworked, are now a prominent factor and it has been thought desirable to recognize this condition in a new specification, rather than to include the material in the present standard specification for refined wrought iron bars. The new specification presents the same tensile and bend test requirements as for the refined bars, but the section on manufacture is particularly adapted to this product.

### INSULATED WIRE AND CABLE

The committee states that this specification has been materially improved. While no extensive revision has been made some new material has been added. The more important changes are as follows:

1. Thickness of Insulation.—A table of recommended thicknesses of insulation for various working pressures has been added together with details of procedure for measuring the thickness, including the variation limits, rejection conditions, etc.
2. A new sub-division covering tape has been added.
3. A new sub-division covering braid has been added.

An interesting feature of the work of the committee on rubber products for the coming year is that the committee contemplates taking up the subject of specifications for weather stripping for cars.

### ELECTRICAL INSULATING MATERIALS

In explanation of its work, the committee states that since its inception it has confined its work entirely to the testing of insulating materials, as the state of the art does not as yet warrant the establishing of specifications for the various materials themselves. This year a standard has been agreed upon for a method of testing insulating varnishes.

The society's tentative standard methods of testing molded insulating materials has now been in use for four years without important criticism, and it is understood that they are in more or less general use by the manufacturers of this class of insulating material. They have also been adopted to standard by the Associated Manufacturers of Electrical Supplies. They are therefore now to be advanced to standard of the A. S. T. M. with some minor changes.

### TWO TESTS FOR SHEET INSULATION

With regard to sheet insulation, the dielectric strength is the most important property. The apparent dielectric strength is greatly affected by the time of application of the testing potential due to the generation of heat, so that two types of test are desirable; one, to give the dielectric strength under a rapidly applied potential or so-called apparent "momentary" dielectric strength, and the other to give the strength under continuous application of potential. No agreement has been reached yet on the test.

In the testing of liquid insulations a great need has been the standardization of the electrodes and length of gap used in testing oils for high-tension transformers and switches. The committee has completed an investigation on this subject and presented its report thereon to the convention and a proposed standard method for testing transformer and switch oils. A proposed standard method was also presented for testing electrical porcelain.

Subjects to which the committee expects to give attention are:

1. Procedure for dielectric strength tests of sheet-insulating materials.
2. Procedure for a sludging test of transformer and switch oils.
3. Preparation of tests of molded insulation for high-frequency applications.
4. Pothead and splicing compounds for underground cables.
5. Dielectric losses in insulating materials.

### CORROSION OF IRON AND STEEL

The five-year test of uncoated sheets exposed in the Pittsburgh district is nearing completion and the committee states that it may definitely be concluded that copper bearing metal shows marked superiority as compared to non-copper bearing material. Iron or steel containing less than 0.15 per cent copper are classed as "non-copper bearing." It is interesting to note that no 16 gage sheet containing 0.06 per cent copper or more has failed after five months' exposure, while 65 per cent have failed of those having 0.03 or less.

In the immersion tests made the presence of copper apparently has little influence on the life of the specimen.

## The Mechanical Man as a Salesman*

BY E. B. GUNN

Superintendent of Transportation and Equipment Western Ohio Railway Company, Wapakoneta, Ohio.

WE HAVE found that by keeping in close contact with our employees, not only our salesmen (the conductors and motormen) but all other members of the organization as well, we are able to keep the force running much smoother and so gain better results.

It is necessary for the mechanical equipment to be kept in good condition so that passengers can get over the line smoothly and quickly; also to prevent frequent pull-offs, as the changing of cars is very objectionable to the traveling public. A failure of the mechanical equipment causes delays which often result in the passenger's missing his connection, which, of course, discourages traffic; and at this time the electric lines need all the friends they can get.

The roadway department's co-operation is just as necessary as that of any other, for a bad track causes derailments and rough riding, which makes the work of the salesmen much harder. It also causes delays and failures of the equipment which are expensive.

It is also just as necessary for the employees to work for the success of the freight department as it is for that of the passenger, with the exception, of course, of the element of personal feeling which does not enter into the freight department. It is from the freight hauling that the electric line must look for its gain, and that is the branch of service, I think, that has been overlooked more than the passenger business. Of course, the motor truck under the present conditions is a great rival of the electric line, but by having a quick, reliable service and safe handling of goods and courteous treatment from all employees the electric line, I believe, will be able to hold a great part of the freight haulage. The time is not far off when the motor trucks must be brought under the supervision of the public utilities commissions, and must file their schedules of rates the same as the electric lines are required to do. When this is done and they are required to pay their proportion for the upkeep of the roads they use, they will then be on the same basis as the electric lines; and, I believe, the selling of the products will be just as easy and the outlook for the electric roads as bright as it was a few years ago. The electric lines have a place in the traffic world and the public will not stand for them to be sidetracked.

It is a problem for us to work out, and the only way that this can be accomplished is, as Mr. Barnes has so ably shown, for all departments to co-operate and all work together. Each and every head of department must get away from the idea that his department is more important than any other, for the man who greases the track is just as necessary along his line as the executive. When the spirit of co-operation permeates the entire organization from the president to the track man, and everyone is pulling for the one and only purpose, *success*, then we will have the success that is sure to come. Let us all get over the dumps and put into the proposition the pep and enthusiasm that the proposition deserves, and that enthusiasm will be communicated to the men under our supervision and they, in turn, will do their best for the success of the electric line, and the business will just have to be successful.

## Valuation and Rate of Return

IN HIS paper on "Valuation and Rate of Return," presented before the joint meeting of the Iowa Electric Railway Association and the Iowa Section of the National Electric Light Association, on June 23, at Lake Okobogi, Iowa, L. B. King, appraisal engineer United Light & Railways Company, Davenport, Iowa, paid particular attention to electric lighting companies, but a few of his remarks are pertinent to railways.

After outlining the purposes of valuation he discusses inventory of property, from which discussion the following extracts are taken:

It is quite essential that every utility should have a valuation of its property, entirely distinct from the "plant and investment" account carried on its balance sheet, because without this knowledge it is impossible for the operators of the plant to know what results are being obtained in the way of net revenues applicable to paying interest charges and dividends from that particular plant.

Unless operating under a uniform classification of accounts, where two valuations have been made of the same property, one by or for the company and the other by or for the city or state, it becomes hard to compare or reconcile these valuations, and this leads to more or less confusion whether the report is presented in court or to a city council. No matter what system is adopted, after one is adopted and the property accounts are classified, later expenditures for new construction should certainly be classified under the account adopted.

The distribution system of either an electric utility or electric railway utility is the most difficult part of the property to inventory and to obtain prices on. It will very seldom be possible to obtain the exact original cost of building the pole lines, stringing the wire, etc., for many reasons, one of which is that the work is done piecemeal and not all expenditures find their way to the proper charges. It is therefore necessary to estimate the cost of poles, wire and erection to a large extent.

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*Abstract of Discussion on Merchandising Transportation, at meeting of Central Electric Railway Association on board S. S. *South American*, Thursday, June 30, 1921.

Mr. King then takes up the question of intangible fixed capital, in which he argues for capitalization of superseded property, of the cost of consolidation of smaller, older companies, development expense, early losses, cost of establishing business, etc.

### CAPITALIZE UNFINISHED CONSTRUCTION

Mr. King also urges the capitalization of unfinished construction. Of this he says: "In the determination of the rate base there should also be included the estimated cost of completing any construction which is under way, and any construction which has been authorized and is certain to be started very soon. Inasmuch as the study of rates is for the purpose of fixing rates for the future, it is only proper that these rates should pay the proper return on additional investments which must be made." The usual account is taken of the subject of working capital.

In his discussion on rate of return, Mr. King points out that many utility commissions have excluded from the valuation the cost of financing, whether this includes the cost of interesting capital, issuing and marketing securities and brokerage fees, or also the discount at which the securities have been sold in order to market them. He then says: "The cost of selling the securities will usually amount to from 2 per cent to 3 per cent of their par value, and the discount frequently runs as high as 25 per cent of the par value. These items, if excluded from the valuation, must be considered in fixing the rate of return which should be insisted upon." With reference to rate of return and the dependent rate schedule, he said: "Certain rates of return have been approved or fixed in many rate cases, and then service rates have been established which were entirely insufficient to earn anywhere near the rate of return which had been approved. When this happens, it is a moral obligation of the regulatory body to make up the deficiency so created by further adjustment in the rate. The mere fixing of a rate of return in an ordinance or decision does not guarantee this rate to the utility, and if the theory of rate-fixing legislation is to be fair, then the deficit created must be made up by future higher rates, and this future must not be so long deferred that the patient dies during the process."

# American Association News

## Special Reorganization Committee Reports

### Recommends J. W. Welsh as Permanent Executive Secretary—Suggests Useful Changes in Constitution and in Procedure

THE special reorganization committee appointed by President Gadsden in response to a resolution of the executive committee to make recommendations regarding reorganization of the headquarters office of the association and any other recommendations regarding the organization or operation of the entire association which it saw fit or thought advisable has now formulated its report and placed it in the hands of the members of the executive committee. The executive committee will hold a meeting which has been tentatively arranged for Aug. 5, at which this report will be considered; but meanwhile the committee decided that it would be advisable to publish an abstract of this report so that the association members might have opportunity to transmit their ideas to the executive committee, and that the executive committee, having the advantage of hearing from the industry, could formulate its program in more nearly complete form, ready for action by the association at Atlantic City in October.

Criticisms of, and suggestions with reference to, these recommendations of the reorganization committee to the executive committee will therefore be welcomed. They should reach the secretary's office not later than Aug. 3, in order to be ready for consideration by the executive committee at its meeting on Aug. 5.

The following is an abstract of the report of this committee. Many of the suggestions, in order to be incorporated in useful form, have necessitated changes in the constitution and bylaws and the committee has therefore drawn up an amended constitution and by-laws in which the following things have been accomplished:

Recognition of the interest in and necessity for study of other transportation systems, and permission under special act of the executive committee for trackless transportation companies to enter the association.

Provision for separate classification of members such as consulting engineers, management companies, investment bankers, etc.

Redefinition of the officers and membership of the executive committee as follows:

A president, to hold office for one year, eligible to re-election.

Four vice-presidents, two elected each year for two-year terms, not eligible to re-election to the executive committee, except as president.

Twelve members at large, six representing manufacturing companies, six representing operating companies; two of each to be elected each year for three-year terms and not eligible to re-election to the same office.

A treasurer, to hold office for one year, subject to re-election.

The two junior living past-presidents, with power to vote.

The four presidents of the affiliated associations.

An executive secretary, who is not a member of the executive committee, but who attends its meetings. He may not be the same person as the treasurer.

Provision for regular monthly meetings of the executive committee.

A classification and amplification of the definition of duties of officers, which make ample provision for the safeguarding of the funds of the association and the issuance of checks.

Provision for a nominating committee, to be appointed early in each summer, which will make public its nominations thirty days before the annual convention. Other nominations may be made by any member at any time before the actual election.

Definite by-law provision for the mid-year conference.

Definite provision for certain standing committees of the association, such as finance, policy, subjects and meetings, publicity, publications and national relations, with the requirement that these committees make monthly reports to the executive committee. All the members of the first two committees are to be members of the executive committee, and the chairmen of the other four are ex officio members of the executive committee, without vote, unless they are already elected members.

Provision for certain other committees having to do with membership and with co-operation with sectional railway associations.

Definition of the duties of the various committees.

Provision that the dues now in the by-laws shall be maximum dues, which the executive committee may lower, but once lowered may not raise without consent of the association.

Provision that privileges of the association shall be withdrawn from members who are a year or more in arrears in dues.

Other suggestions which the committee has considered and regarding which it makes recommendations are:

That the executive committee consider in its own meeting the question of arranging for admission of municipally owned railways to membership. The executive committee has a subcommittee of its own on this subject which will present data to it.

That the executive committee make a study of the present system of dues.

That the association do not sponsor certain experts in labor, legal, technical or other special lines.

That the executive committee give closer supervision to committee work, arranging that committee reports may be made public at any time during the year whenever finished, rather than holding them to flood the annual convention.

That the executive committee create a special committee for co-operation with educational institutions of the country, to encourage the study of railway and public utility problems, and to assist in placing young engineers with railways.

That the committee codify its own regulations as a sort of executive committee by-laws.

That the executive committee consider the advisability of incorporating the association.

That due consideration be given to the geographical distribution of the executive and other committee meetings, to the selection of executive and other committee members, and that the association co-operate with various sectional associations and arrange for representation of the American Association at their meetings.

That the executive committee outline some policy to promote continuous work by committees to avoid a halt in activities for a month or two after annual association meetings, which frequently occurs. Suggestion was made of appointing committee members for a term of years, a portion of the committee retiring each year.

That the executive committee consider giving publicity through the Advertising Section to the sense of responsibility which the electric railway industry today feels in trying to provide complete transportation service to a community.

The question of *Aera* being continued as a magazine or changed to a bulletin was brought before the committee. The *Aera* advisory board was requested to make a report on this subject to the committee. This was presented by Chairman C. L. Henry of the advisory board in person. There was considerable discussion on the benefits of *Aera* as the association's official mouthpiece and as an agent to promote company section work and to reach the rank and file of the industry. There was a discussion as to how best *Aera* could cooperate and avoid unnecessary duplication with existing technical magazines in the railway field. The committee in accepting the report decided to recommend the continuation of *Aera* as a magazine in its present general form.

Finally, in response to a special request of the executive committee to suggest a name or names for the position of secretary, to fill the vacancy created by Mr. Burritt's resignation, the committee recommends that J. W. Welsh be appointed secretary, to date from July 1, 1921.

## Progress on Heavy Traction Report

AT A meeting of the heavy electric traction committee, held in the association office on June 23, a draft of the committee's report was read and discussed, after which various suggestions offered by members present and by letter were considered. It was decided to include in the report news of a 60-ton Westinghouse switching locomotive of standard design and of a Butte, Anaconda & Pacific tractor truck, used for switching, as well as views of the Westinghouse and General Electric Paulista locomotives. The tabulated data on multiple-unit equipment, which are being prepared by the General Electric and Westinghouse companies, will be consolidated for presentation in the report as soon as received by the chairman.

Those who were present and participated in the discussions were Sidney Withington, chairman; C. M. Quereau, John C. Davidson, A. H. Armstrong, J. V. B. Duer, Mr. Masson, representing H. W. Cope, and Mr. Sloan.

## Association Announces 1921 Convention Program

THE plans for the 1921 convention at Atlantic City of the American Electric Railway Association have advanced far enough so that the association is able now to announce the tentative program. The duration of the meeting will be as usual from Monday to Thursday inclusive, or from Oct. 3 to Oct. 6. The general subjects to be considered in formal papers, topical discussions or addresses are: (1) a paper on the influence of the electric railways in improving industrial efficiency; (2) a paper on the contrasted advantages of service-at-cost contract franchise and state regulation; (3) a paper on the comparative condition of the industry today and four years ago; (4) a topical discussion on electric railway finance; (5) an address by some public official on a subject relating to the industry.

The first subject will bring out the fact that electric railways are essential to the maintenance of community and commercial life, and that this fact should be kept before the investors and general public. The existence of a street railway has often been taken as a matter of fact, and at present there is much discussion as to whether or not surface railways will be extended. Some hold that as yet the electric lines have not had a full opportunity to demonstrate their maximum utility because of restrictions placed by state laws and franchises prohibiting the transportation of commodities, and it is possible that this view may be presented by one of the papers on this subject.

The paper on service-at-cost will take up the two methods of rate adjustments and present the advantages appertaining thereto so as to permit careful study. Some operators prefer the service-at-cost while others believe state regulation of rates and service to be more desirable.

The subject of comparative conditions divides into four parts, namely, community relationships, plant and facilities, net earnings and finances, and it is hoped that each of these will be covered.

The discussion on electric railway financing will continue that begun at the last mid-year meeting, and a basis of discussion is found in present requirements for mortgage securities, home town financing, financing by sale of capital shares and municipal aid.

The names of those who will present papers on the different topics mentioned will be made public by the secretary of the association as soon as definite arrangements along this line have been made.

The association is not yet ready to announce the name of the public official who it is expected will address the members of the association at the convention.

## Committee Plans Increased Activity Organizing Company Sections

THE committee on company sections and individual membership of the association is planning a campaign to organize additional company sections among member companies.

A meeting of the committee is to be held in the immediate future, to discuss the details of the plan to place before electric railways the benefits to be derived from company section organization. The original company section committee, which consisted of Martin Schreiber, chief engineer and manager, southern division, Public Service Railway, Camden, N. J., as chairman; Charles C. Peirce, manager railway department General Electric Company, Boston, Mass., and H. H. Norris, managing editor ELECTRIC RAILWAY JOURNAL, New York, N. Y., was recently enlarged by the appointment of the following members: F. G. Buffe, general manager Kansas City (Mo.) Railways; E. F. Wickwire, sales manager Ohio Brass Company, Mansfield, Ohio; J. P. Barnes, president Louisville (Ky.) Railway; P. S. Arkwright, president Georgia Railway & Power Company, Atlanta, Ga.; and B. J. Mallon, assistant general manager Metropolitan West Side Elevated Railway, Chicago, Ill.

The idea which the committee has in mind is the revival of the interest taken in company sections. Prior to the war there were twelve organizations of this kind located at points throughout the country, each of which was maintaining considerable enthusiasm among its members and educational work pertaining to the industry.

During the war many members entered military service and company section activities were suspended. Since the close of the war two new company sections have been organized and many companies are now considering the organization of sections. The committee will be glad to co-operate in every way possible to the furtherance of such plans.

## Merchandising Transportation

THE final meeting of the committee on merchandising transportation of the T. & T. Association was held at the association's headquarters on July 14. Those present were J. H. Alexander, Cleveland; H. C. Clark, Newark; G. T. Seeley, Youngstown; K. A. Simmon, for M. B. Lambert, East Pittsburgh.

Since the previous meeting the chairman had prepared in tentative form the full report and had forwarded it to all members for comment. Letters either of approval or criticism from those of the committee unable to be present and others were read, and their comments as they referred to the report were noted. The chairman will present the completed report to the executive committee next week. The report this year will detail actual means of merchandising transportation as practiced by the industry and is a supplement to the report of last year.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Suspension Contemplated

### Receivers at Des Moines Appeal to Court for Permission to Shut Down All Service

The receivers for the Des Moines (Ia.) City Railway filed a petition during the week ended July 9 with Judge Martin J. Wade of the federal court asking that they be allowed completely to suspend operation of the railway system in Des Moines.

Judge Wade set July 13 as the date for hearing arguments on the motion and F. C. Chambers, operating receiver, is authority for the statement that in the event the petition is allowed service will be suspended one week from the date of Judge Wade's order.

### Receivers Lose Hope

This seemingly drastic step was taken by the receivers only after all hope had apparently disappeared of securing relief through the City Council.

M. H. McClean, representing the Harris Trust & Savings Bank, Chicago, acting for security holders of the railway, appeared before the City Council recently with a program for the solution of the railway problem. He proposed to the Council that the owners of the local plant would undertake to secure the funds necessary to secure electrical equipment to restore full service in Des Moines if the City Council would take the following action:

1. Declare the present franchise forfeited.
2. Eliminate the present destructive bus competition.
3. Initiate proceedings looking to the negotiation of a new service-at-cost franchise.
4. Declare its intent to refrain from demanding extensions or extensive reconstruction and from the levying of burdensome special assessments for paving while the company is financially unable to undertake such things.

This program apparently made little impression upon members of the Council and ultimately all four measures were killed by being received and filed. The bus measure appeared to have some chance of passage, but in a stormy session of the Council, in which bus owners and members of improvement leagues were present the ordinance was defeated on its second reading.

### Mayor Regards Buses as Insufficient

The program had the indorsement of the Corporation Counsel and received partial support from Mayor Barton. Mr. Barton's attitude with regard to ruling the buses off the street was that this measure should be taken only in the event that the railway agreed to make a substantial reduction in fares. Mayor Barton, however, addressed a letter to the Council in which he stated that the city could not hope to depend upon the buses for transportation.

As the situation now stands, apparently no real action toward a settlement is to be taken until Judge Wade rules on the petition filed with the court by the receivers.

Judge Wade on July 13 took under advisement the petition of the receivers of the Des Moines City Railway for a complete suspension of service. His ruling is expected within twenty-four hours. Just previous to the hearing the city of Des Moines filed a belated resistance to the petition and city attorneys argued for a delay in suspension.

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## Wage Cuts Being Negotiated in New York

Frank Hedley, president and general manager of the Interborough Rapid Transit Company, New York, N. Y., announced officially on July 12 that he had asked the employees to accept a 10 per cent cut in wages beginning July 24. The present agreement between the company and the Interborough Brotherhood expires on Dec. 31.

Mr. Hedley said that some time ago when the cost of living was rapidly rising, the company at the request of the men voluntarily increased wages, although it had a contract with the men for a fixed wage. Now that conditions are the reverse, the company has requested the men to treat it the same as the company has treated them.

The cut, if accepted, will affect some 14,500 men. Under the present scale of wages motormen are getting 86 cents an hour, guards 58 cents, laborers from 48 cents to 58 cents, and the mechanical forces from 65 to 80 cents an hour.

It is understood that the company has guaranteed that if the men accept the proposed cut, no further lowering of wages will be made until July, 1922, six months after the present agreement with the Brotherhood expires.

Negotiations are in progress between Receiver Hedges of the New York Railways and the employees of that company looking to a similar decrease in wages. The number of men affected by these negotiations is reported to be about 5,000.

As has been stated previously in the Electric Railway Journal negotiations are also in progress in Brooklyn looking to a cut in the pay of the men employed on the Brooklyn Rapid Transit System. The cut in wages there is expected to be made on Aug. 6 when the agreement between the men and the company expires. It is said that it will be at least 10 per cent. Receiver Garrison is understood to favor a reduction of from 12 to 15 per cent. The employees are conferring among themselves, and their representatives will in turn meet the officials of the company during the week ended July 23 to agree on the size of the decrease.

## Another Brawl Started

### Chicago's "City Hall" Will Endeavor to Get Five-Cent Fare—Mayor Before New Commission

Mayor Thompson on July 8 started his long promised fight for restoration of the 5-cent fare on the Chicago surface lines. This was in the shape of five petitions filed before the new Illinois Commerce Commission against the Chicago Surface Lines and its four component companies. The petitioners were the city of Chicago, Mayor Thompson and four other "citizens and taxpayers." The preliminary hearing was set for July 12.

The petitions reiterate many of the Mayor's arguments against the surface line companies, arguments which failed to stand the test before the old utilities commission or the courts. He evidently expects to get a more favorable ruling from a friendly commission, the members of which were reappointed recently by his political ally, Governor Small. The petitioners ask that the "final order" entered by the former commission on Nov. 5, 1920, be rescinded, altered or amended and that the rate of fare be reduced from 8 to 5 cents.

Contending that the contract ordinances under which the companies are operating have been abrogated by the "acceptance of a rate of fare higher than 5 cents, the petitioners ask the commission to restore the old rate regardless of the ordinance provision." This is said to be warranted by a change in conditions due to decreased cost of operation. They also ask that the $7,000,000 now in the renewal fund be applied to the reduction of fares, and that the city's share of the net receipts for the past two years be used for the same purpose or turned over to the municipality for use and occupation of the streets. This latter sum of about $3,500,000 was tendered to the city by the companies but was refused because the Mayor has insisted that an acceptance would be a recognition that the ordinances of 1907 are still in effect.

The petitioners also attack the Board of Supervising Engineers, claiming that it has no legal right to exist and that the members should not be paid out of the operating expenses of the companies. The commission also is asked to inquire into the salaries paid certain officers and lawyers employed by the companies. The unusual suggestion is made that the companies are not entitled to any return on their investment until they "comply with the law and furnish adequate service." In any event it is alleged that they should not be allowed a return greater than the 5 per cent fixed by the ordinances.

## New Orleans No Nearer Settlement

The Commission Council of New Orleans, La., at the conference on July 7 wound up the discussion bearing upon a solution of the city's traction troubles without reaching a definite conclusion. The hearing was confined largely to the matter of the valuation of the railway.

Representatives of the association of commerce and the advisory committee of forty appeared and urged the members of the Commission Council to take immediate action in the matter. They insisted that the commissioners had already had enough advice.

W. S. Penick, one of the committee of forty, said he was impressed with the work of the sub-committee that fixed the valuation and that the amount named ($44,700,000) was less than some of the members present thought the property was worth.

The conference adjourned with the promise that when "the thing is whipped into shape" those interested would hear from the city.

The delay of the city has entangled it in a web of litigation which will hardly permit the commissioners to extricate themselves before winter. Up to the present time the litigation pending is as follows:

The railway has enjoined the city, in the federal court, from interfering with the receiver in the collection of an 8-cent fare.

The railway has instituted injunction proceedings against the State of Louisiana, in the Civil District Court, restraining it from interfering in the pending controversy between the city and the railway, looking to an adjustment of the city's traction troubles.

The State of Louisiana, through the Attorney-General's office, seeks to restrain the city by injunction from reaching a settlement with the railway upon any terms not in keeping with the company's franchise alleged to have been obtained from the State and not from the municipality.

## Seattle Case to Be Determined on Its Merits

In a decision handed by Judge Jeremiah Neterer in the United States District Court recently, the application was granted that has been made by S. B. Asia and thirteen taxpayers of Seattle, Wash., for dismissal of the amended complaint filed by the Puget Sound Power & Light Company for a restraining order to prevent the fourteen taxpayers from interfering with the city in the payment of the interest and principal on the $15,000,000 of bonds issued by the city in payment of the railway lines now included in the system of the Seattle Municipal Railway.

The court said:

> For the reasons given in the decisions filed on April 1, and on March 12, the motion of the defendant is granted. The issue should be determined at the earliest date. The Circuit Court of Appeals convenes in this city in September and it is possible to have the action of this court reviewed at that time if the parties are so disposed, and all parties may then rest secure in the proceeding which must be adopted.

Judge Neterer handed down a decision on March 12 denying the application of the Stone & Webster interests for a temporary injunction against the fourteen taxpayers. The amended complaint upon which the appeal was handed down recently was in the nature of an appeal from that decision. At that time, the court held that the Superior Court had full jurisdiction in the case. The court held that the payment of the interest when due removed the "contingency which no doubt caused the plaintiff to move in this case and this was done without order or suggestion from this court."

## Public Hearing on Question of Rehabilitation

The City Council of Portland, Ore., has adopted a resolution requesting the Public Service Commission to call a public hearing to discuss the question of whether the Portland Railway, Light & Power Company has made the expenditures for maintenance and reconstruction which it promised to make prior to the granting of the 8-cent fare. F. I. Fuller, vice-president of the company, states that his company has no objection to the investigation. He said that in the last seventeen months the company has spent $431,000 for maintenance, reconstruction and general track and roadway work. The total maintenance for this period was $1,033,793.

## Highway Legislation Before Congress

There is a growing feeling in Congress that federal aid highways should not be "free from tolls of all kinds" as is provided in both the Dowell and Townsend bills now before Congress and in the existing law. This is due to the increasing tendency on the part of motor common carriers to use the public highways without making returns for the use of this facility.

It is recognized that it is frequently very difficult to require a common carrier or a contract carrier performing his service on a highway without penalizing the farmer or other producer in his efforts to get his products to market. Some are of the opinion that the federal law should contain no inhibition against tolls and that the matter better could be left to the states, since the question involved is almost always a local one.

Highway legislation marked time during the week ended July 9. Senator Townsend found it impossible to be in Washington during the week. Both the highway bills are at present under his immediate jurisdiction. The Dowell bill, which recently passed the House as a rider on the Phipps bill, was referred to Senator Townsend's committee. The Townsend bill itself is on the Senate calendar. Senator Townsend is in a position to call the bill up at nearly any time that he desires.

## City Still Opposing Indianapolis Street Railway

At a conference of officials of the city and Indianapolis Street Railway recently, the traction men refused to enter negotiations for a contract which would give the city all regulatory rights over the company excepting that relating to rates.

Mayor Jewett said that Dr. Henry Jameson, chairman of the board of the utility, promised him that if the city would not use its influence against the bill to permit public utilities to surrender their franchises all the company would desire to do would be to get relief from the fare provisions of its contract with the city and would submit to city regulation in all other matters.

Dr. Jameson denied having made such a promise. He insisted that he was standing by his word.

Upon refusal of the company to enter into negotiations for the contract Corporation Counsel Samuel Ashby announced that the city will seek to have its common council pass an ordinance or ordinances granting it such regulatory powers as it desires, under authority of section 10 of the public service commission law which provides for such procedure in the case of a utility operating under an indeterminate permit.

It seems certain that the city will insist upon its right to collect $30,000 a year for the next five years and $50,000 for the seven years thereafter as a franchise tax payment to the board of park commissioners, as was guaranteed under the surrendered franchise. It also appeared probable that the city will insist that the company continue to pay both for original cost and maintenance of pavement between its tracks.

The traction men insisted that for the city to continue to require these things would constitute burdens which would either break the company's back or necessitate appeal to the Public Service Commission for higher fares. They were pessimistic about the relief to be obtained from a rate greater than 5 cents, because the recent 6-cent charge brought in less revenue than did the nickel when coupled with a charge for transfers.

## Arbitrators Reduce Wages in Des Moines

Wages of the employees of the Des Moines City Railway have been reduced from a maximum of 70 cents an hour, the old scale, to a maximum of 59 cents by the findings of the board of arbiters chosen by the company and the men. The employees had sought an increase to a maximum of 80 cents, while the company asked a reduction to 57 cents. The high rate goes to men of more than nine months' service. Those serving their first three months will receive 53 cents and the men over three months and less than nine months 56 cents. The agreement fixed by the arbitrators became effective on July 1.

### Jersey Value $82,000,000—Increased Charge for Transfers

The Board of Public Utility Commissioners of New Jersey at noon on July 14 filed its decision in the investigation of the rates of the Public Service Railway. The board continued the 7-cent fare, but increased the charge for transfers from 1 to 2 cents. It finds a valuation of $82,000,000 for the property, and estimates the income to be produced by the additional transfer charge, together with the company's other revenue, will afford a return of slightly more than 7 per cent on the value found.

The board's decision is voluminous, comprising more than seventy typewritten pages. It discusses in detail the different estimates of value submitted to the board, the capitalization of the company, its revenues and operating expenses. The board states that it had before it data regarding the value of the company as included in the Cooley appraisal, which was made by the company; the appraisal made by Ford, Bacon & Davis, under contract with the State Appraisal Commission; testimony of the board's own experts and that of the experts for the municipalities and historical costs of the property as developed by witnesses of the municipalities.

The principles of the valuation as declared by the New Jersey courts are referred to and applied by the board. In addition to the decision of the New Jersey courts numerous decisions of the United States Supreme Court and courts and commissions of other States are cited and the principles therein set forth are discussed.

The board found itself unable in view of the testimony presented to accept the valuation figures as presented by Ford, Bacon & Davis to the special state valuation board.

The valuation as found by Ford, Bacon & Davis for the State was $125,000,000. The valuation as found by Dean Cooley for the company was $200,000,000. The value claimed by the municipalities was $60,000,000. Other phases of the rate case are referred to elsewhere in this issue.

### Interurban Will Electrify Track to Union Station

The Denver & Interurban Railroad will take steps immediately to electrify the Burlington Railway right-of-way from Utah Junction to Union Station in Denver, according to announcement made in Denver on July 9. The work will occupy about six months' time, the cars being routed over the present line via Globeville and over the Denver Tramway tracks until the project is completed.

Provision for electrification of the railway line into Denver and shortening of the route was contained in a rate increase which was given the company last fall by the state Public Utilities Commission. The estimated cut in the running time under the new system is 20 minutes with the elimination of all the attendant congestion of traffic in Denver streets over which the cars run.

Under the new plan, the electric cars will not run into the Union station proper but will have their terminus on the Colorado and Southern coach tracks to the north of the main lines. With the new system in effect no additional charge, it is understood, will be made for city fares in Denver which are now collected by the tramway company there as franchise rights. This will, under prevailing street car rates in Denver, lower the round trip fare 16 cents.

### City to Make Offer for Woodward and Fort Lines

At a conference of the members of the Street Railway Commission with three representatives of the Detroit (Mich.) United Railway on July 8 it was announced that the city would soon tender an offer to the company for the lines on Fort Street and on Woodward Avenue, where the franchises have expired. It is from these streets that the courts have held that the city has the right to order the company to remove its tracks.

According to a statement by Alex Dow, speaking for the company, the company will give its answer as to whether or not it is willing to accept the figures named by the city within forty-eight hours after receiving the commission's offer. No decision was reached by the commission at the recent meeting as to what figures the city will name for the two lines.

The question of ratifying the purchase of these two lines, which will link up the new municipal system with the down-town district, will be decided at the November election. Final decision will be left to the voters and they will be asked to authorize the purchase of the lines at that time.

Some time ago the Detroit United Railway signified its willingness to sell the two lines at such time as the people desired to take them over. Although no announcement was made by company officials following the last meeting, Allan F. Edwards, vice-president of the railway, stated that the company's attitude had not changed. Both Mr. Edwards and Mr. Dow declined to make any statement at the present time except to say that the company was ready to sell these lines to the city.

### Denver Plans Wage Readjustment

Negotiations will be entered into in the near future between a committee of employees' representatives and E. Stenger, receiver for the Denver Tramway, looking toward a general wage readjustment. In the meantime, the employees' representatives have notified the trainmen that Receiver Stenger will not restore the top wage of 58 cents an hour which was in effect at the time of the August, 1920, strike—a rate approximately 90 per cent of the present trainmen would have automatically received next month or soon thereafter.

### Fares May Go Up in Cincinnati

There will be no reduction in fares on the lines of the Cincinnati (Ohio) Traction Company on Aug. 1. This is a direct result of activity of the citizens' committee, of which William J. Schultz is chairman. Instead there is a likelihood of fares going up on the strength of petitions filed by the committee with the city auditor. The petitions ask for a referendum on the ordinance recently passed by the City Council providing for the lowering of fares.

The filing of the petitions has the effect of suspending the operation of the new ordinance. It means, therefore, that the 1918 franchise ordinance still is in force and under its terms when the traction company suffers a deficit for two months in succession it may give notice of an increase in fares on the fifteenth of the following month, to take effect on the first day of the month thereafter.

The committee submitted 178 petitions which contain a total of 16,644 names. Less than 10,000 signatures were required. The petition seeks to submit the ordinance to the voters at the November election, thus holding up the issue until after that time. Mr. Schultz declared that if the ordinance is voted down by the citizens he will introduce an ordinance by initiative petition providing for a reduction of fares at the rate of one-half cent each month until a level of 5 cents is reached.

City officials pointed out that under the law the formal acceptance by a public utility of any franchise ordinance or an amendment is necessary before the ordinance can become effective. Such an ordinance will take care of the deficits, it was pointed out, and the traction company is not likely to accept it because of these conditions. Mr. Schultz's idea is to abolish the annual franchise tax of $350,000 paid to the city by the traction company.

Mayor John Galvin, when informed that the petitions had been filed, said it is too bad that a condition of this kind should arise.

### Duluth Absconder Captured

Berger T. Jager, former confidential secretary to Vice-President A. M. Robertson of the Twin City Rapid Transit Company, is in the Hennepin County jail under indictment for grand larceny. After confessing to a Cincinnati clergyman he wrote to Mr. Robertson offering to give himself up, and arrived July 9 in Minneapolis in charge of a Pinkerton man. On Jan. 29 it was discovered Jager had converted to his own use a Duluth-Superior Traction Company check for $4,825. On Jan 31 it was discovered he had taken from a safety deposit vault $127,000 in securities belonging to the Duluth company. Of these securities $116,000 were recovered on July 2. Jager had been employed fifteen years by the company before his resignation and disappearance.

# Financial and Corporate

## Milwaukee Sells Stock

### $3,000,000 of New Issue being Placed Locally in Campaign with Several Novel Features

A novel advertising scheme has just been made use of by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., in selling its securities direct to the public. The company is one of the pioneers in direct sales of securities. As reported in the ELECTRIC RAILWAY JOURNAL of June 11, 1921, page 1100, it recently increased its capital stock. It was decided to offer for sale in 1921 a part of the new issue of preferred stock, largely for the purpose of transforming floating debt incurred during recent years for additions to plant and property to a permanent investment basis. In order to attract attention to the sale which was to begin on June 30, 1921, all the 700 city and interurban cars of the company appeared on the morning of June 30 carrying large banners on their sides calling attention to the sale of securities. As is shown in the accompanying illustration, the banners read: "T. M. E. R. & L. Co. 8 Per Cent Cumulative Preferred Stock. On sale today. Public Service Building."

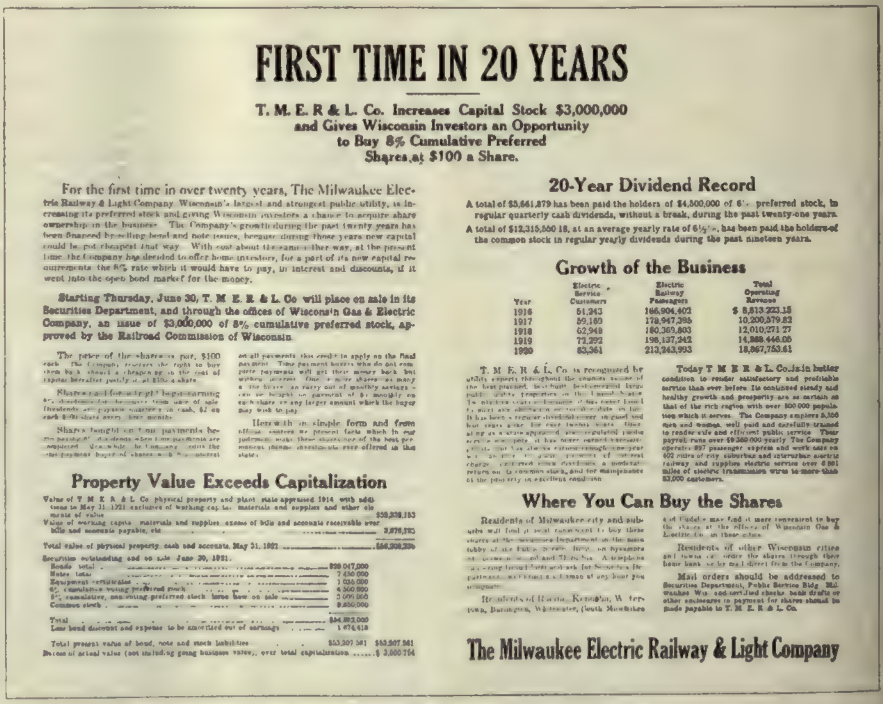
BANNER DISPLAYED ON MILWAUKEE CARS

### BANNERS PRODUCE SENSATION

The banners produced something akin to a sensation since they resembled banners announcing picnics. This caused everybody to endeavor to get a good look at them. The banners were supplemented on June 30 by half-page advertisements in the principal Milwaukee daily newspapers, giving further details of the stock issue and of the sale in general. The advertising campaign is being continued, a quarter-page advertisement being used in the large dailies since July 1. Advertising will also be carried in the various Wisconsin dailies and weeklies. In addition, the company has asked the co-operation of its employees to help sell the securities. A small commission will be paid for each share of stock sold by them.

The methods employed by the Milwaukee Electric Railway & Light Company and its affiliated companies in Wisconsin in selling their securities to the public were described in some detail in the paper, "Home-Town Financing," read by S. B. Way, vice-president and general manager of the company, before the 1921 mid-year meeting of the American Electric Railway Association. This paper was printed in the ELECTRIC RAILWAY JOURNAL of Feb. 12, 1921, page 304.

The stock being sold is a $3,000 000 issue of 8 per cent cumulative non-voting preferred. It is being sold at par ($100). The issue has been approved by the Wisconsin Railroad Commission. The advertisements announcing the sale of this stock call attention to the fact that the increase in preferred stock is the first in twenty years. During the past twenty-one years, according to these advertisements, the company paid a total of $5,661,879 to holders of the $4,500,000 of 6 per cent preferred stock in regular quarterly cash dividends. The holders of the common stock have received during the past nineteen years a total of $12,315,550, or at an average yearly rate of 6½ per cent.



FIRST TIME IN 20 YEARS

**T. M. E. R & L. Co. Increases Capital Stock $3,000,000 and Gives Wisconsin Investors an Opportunity to Buy 8% Cumulative Preferred Shares at $100 a Share.**

For the first time in over twenty years, The Milwaukee Electric Railway & Light Company, Wisconsin's largest and strongest public utility, is increasing its preferred stock and giving Wisconsin investors a chance to acquire share ownership in the business. The Company's growth during the past twenty years has been financed by selling bond and note issues, because during those years new capital could be got cheapest that way. With cost about the same either way, at the present time the Company has decided to offer home investors, for a part of its new capital requirements, the 8% rate which it would have to pay, in interest and discounts, if it went into the open bond market for the money.

**Starting Thursday, June 30, T. M. E. R. & L. Co will place on sale in its Securities Department, and through the offices of Wisconsin Gas & Electric Company, an issue of $3,000,000 of 8% cumulative preferred stock, approved by the Railroad Commission of Wisconsin.**

Property Value Exceeds Capitalization

Value of T. M. E. R. & L. Co. physical property and plant state appraised 1914, with additions to May 31, 1921, exclusive of working capital, materials and supplies and other elements of value ........ $52,232,153

Value of working capital, materials and supplies, excess of bills and accounts receivable over bills and accounts payable, etc. ........ 3,976,183

Total value of physical property, cash and accounts, May 31, 1921 ........ $56,208,336

Securities outstanding and on sale June 30, 1921.

| | |
|---|---|
| Bonds total | $29,047,000 |
| Notes total | 7,430,000 |
| Equipment certificates | 1,035,000 |
| 6% cumulative voting preferred stock | 4,500,000 |
| 8% cumulative, non-voting preferred stock issue now on sale | 3,000,000 |
| Common stock | 9,850,000 |
| Total | $54,882,000 |
| Less bond discount and expense to be amortized out of earnings | 1,674,419 |
| Total present value of bond, note and stock liabilities | $53,207,581 |

Excess of actual value (not including going business value), over total capitalization ......$ 3,000,754

20-Year Dividend Record

A total of $5,661,879 has been paid the holders of $4,500,000 of 6% preferred stock, in regular quarterly cash dividends, without a break, during the past twenty-one years.

A total of $12,315,550 18, at an average yearly rate of 6½%, has been paid the holders of the common stock in regular yearly dividends during the past nineteen years.

Growth of the Business

| Year | Electric Service Customers | Electric Railway Passengers | Total Operating Revenue |
|---|---|---|---|
| 1916 | 51,243 | 166,904,402 | $ 8,813,223.15 |
| 1917 | 59,160 | 178,947,395 | 10,200,579.82 |
| 1918 | 62,948 | 180,363,803 | 12,010,271.27 |
| 1919 | 72,292 | 198,137,242 | 14,888,446.05 |
| 1920 | 83,361 | 213,243,993 | 18,867,753.61 |

Today T. M. E. R. & L. Co. is in better condition to render satisfactory and profitable service than ever before. Its continued steady and healthy growth and prosperity are as certain as that of the rich region with over 800 000 population which it serves. The Company employs 5,300 men and women, well paid and carefully trained to render safe and efficient public service. Their payroll runs over $9,360 000 yearly. The Company operates 897 passenger, express and work cars on 403 miles of city, suburban and interurban electric railway, and supplies electric service over 8 881 miles of electric transmission wires to more than 83,000 customers.

Where You Can Buy the Shares

Residents of other Wisconsin cities and towns can order the shares through their home bank or by mail direct from the Company.

Mail orders should be addressed to Securities Department, Public Service Bldg, Milwaukee, Wis. and certified checks, bank drafts or other enclosures in payment for shares should be made payable to T. M. E. R. & L. Co.

The Milwaukee Electric Railway & Light Company

EFFECTIVE ADVERTISEMENT USED IN MILWAUKEE CAMPAIGN

## Adequate Junior Financing

### Practical Application of Doctrine of Bankers' Association to Be Made by Holding Company

A committee of the stockholders of the North American Company, New York, N. Y., has recommended to the stockholders a plan and agreement for the reclassification and readjustment of the capital stock of the company. The subsidiaries serve rapidly growing districts constantly demanding increased facilities with the attendant large requirements for new capital. It is explained that continued employment by subsidiaries of bonds and notes as the sole means of financing the cost of such added facilities tends in time to produce a financial set-up top-heavy in debt and to impair the credit of the parent company and its subsidiaries.

In other words, the rapid growth of the properties has required a larger amount of capital than the subsidiaries could provide and it has been necessary to make up the balance from surplus earnings, with the result that the quoted market discount on the stock of the holding company as now organized has made it impossible to meet these capital requirements from the sale of additional amounts of such stock. It thus becomes imperative that a readjustment of capitalization be effected which will make it practicable to raise new capital and permit distribution of a larger proportion of these earnings to stockholders.

The present authorized capital of the company is $30,000,000, all common, of which $29,793,300 is outstanding. It is proposed to provide an authorized capital of $60,000,000 to consist of $30,000,000 of 6 per cent cumulative preferred stock to be redeemable at 105 per cent of par and $30,000,000 of common stock. Under this plan there will be issued to each stockholder for each $100 share held at present $50 par value of 6 per cent cumulative preferred stock and $50 par value of common stock.

This will require the issuance of the same amount of stock as is now outstanding, so that upon completion of the plan recommended, the relative position of each stockholder will be maintained, unaltered as far as his proportionate interest in the assets of the company are concerned. On the other hand, however, the new plan has the advantage that the preferred stock with its fixed dividends of 6 per cent and the small proportion of the total earnings required therefor should rank as a high-grade investment stock.

Since the return on one-half the capitalization will be limited to 6 per cent, all remaining earnings will be applicable to the common stock. The larger sum thus left available for this issue, it is hoped, will warrant this stock enjoying a market from time to time at par or above. In this way it is expected provision can be made for financing the capital requirements of the subsidiaries, thus permitting the release for dividends of a larger percentage of the subsidiaries' earnings.

The matter of a readjustment of the capitalization of the company was first considered in 1917. Prior to the annual meeting of the stockholders in 1920 a plan was submitted and received the approval of a majority of the stockholders. It was later withdrawn, however, for further consideration. The directors believe that the plan now offered obviates the only objection which was offered to the plan of 1920.

## Future Encouraging

### Increased Traffic on London Railways Fails to Offset Increase in Operating Expenses

In the 1920 comparative statement of the operations of the five companies, which became parties to the agreement made under the London Electric Railway Facilities Act of 1915, there is shown an increase in traffic receipts of £1,924,388, or 20 per cent over 1919. At the same time the operating expenses increased £2,199,249, or 26.9 per cent over the preceding year.

Allowing for an increase in the miscellaneous receipts of more than £130,000, the net income for 1920 was £141,895 less than in 1919. The statement of the London General Omnibus Company is more encouraging than in 1919, the net income being a deficit of only £1,942 or a gain of £137,062. The reason, therefore, for the total decrease in net income over 1919 was due to the large decreases of the London Electric Railway of £167,607, the City & South London Company £41,275, and the Central London Railway £84,668.

Some idea of the rapid growth of the service rendered by the London underground Electric Railways may be obtained by the fact that 98,309,320 more passengers were carried than in 1919, an increase of 5.7 per cent. During the same period the total car miles increased 17,751,663, or 11.9 per cent.

During the year the London General Omnibus Company placed an order for 500 "K" type motor omnibuses, making together with those ordered the previous year 1,000 in all, of which 547 had been put into service up to Dec. 31, 1920. Another order has been placed for an improved bus known as the "S" type. The company will then have omnibuses of the "B" type seating thirty-four passengers, the "K" type seating forty-six passengers, and the "S" type seating fifty-four passengers.

A bill which was promoted by the four railway companies for an increase in rates received the Royal assent on August 16, 1920. The new fare was put into operation on Sept. 26, by which ordinary fares were increased about 30 per cent, and workmen's fares and season tickets were also increased. On the same date a new schedule of rates was introduced by the London General Omnibus Company. The results of the increase thus far are up to expectations.

STATISTICAL INFORMATION OF ROADS IN LONDON FOR YEAR 1920

| | Metropolitan District Railway | London Electric Railway | City and South London Railway | Central London Railway | London General Omnibus Company | Total |
|---|---|---|---|---|---|---|
| Mileage—first track | 27.825 | 24.137 | 7.325 | 6.825 | ........ | ........ |
| second track | 26.887 | 23.775 | 7.325 | 6.764 | ........ | ........ |
| Total single track | 70.800 | 57.613 | 15.680 | 21.375 | ( )577 | ........ |
| Train-miles—active | 5,109.101 | 6,717.301 | ........ | ........ | ........ | ........ |
| idle | 142.620 | 119.053 | ........ | ........ | ........ | ........ |
| Total train-miles operated | 5,251,721 | 6,836,354 | ........ | ........ | ........ | ........ |
| Total car-miles operated | 19,562,491 | 27,862,463 | 7,391,809 | 8,069,045 | 85,843,092 | 148,728,900 |
| Revenue passengers carried: | | | | | | |
| Ordinary (cash) | (a) 95,320,179 | 112,703,726 | 26,443,739 | 39,328,973 | 767,953,649 | 1,041,750,266 |
| Workmen | (a) 24,338,296 | 32,946,156 | 12,011,225 | 4,536,672 | ........ | 73,832,349 |
| Season | (a) 28,040,865 | 18,940,220 | 2,683,928 | 6,454,240 | ........ | 56,119,253 |
| Total passengers | (a) 147,699,340 | 164,590,102 | 41,138,892 | 50,319,885 | 767,953,649 | 1,171,701,868 |
| Gross passenger revenue | £1,533,000 | £1,716,476 | £353,104 | £525,083 | £6,533,951 | £10,661,614 |
| Average fare per passenger (pence) | 2.49 | 2.49 | 2.06 | 2.46 | 2.04 | 2 18 |
| Statistics per car-mile: | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. |
| Traffic receipts | 1 9 67 | 1 2.78 | 0 11.47 | 1 3.63 | 1 6.27 | 1 6.72 |
| Operating expenses | 1 6.53 | 0 11.94 | 0 10 45 | 1 2.43 | 1 6.64 | 1 4 74 |
| Net income | 0 10.30 | 0 1.53 | 0 0.45 | 0 1.76 | ( )0 0.005 | 0 1.76 |
| Passenger traffic | .. 7.55 | .. 5.91 | .. 5.57 | .. 6 23 | .. 8.94 | .. 7.88 |

(a) Estimated. ( ) Deficit. (c) Miles of street on which buses operate, of which 222 miles are over tramway tracks.

INCOME STATEMENT OF ROADS IN LONDON FOR YEAR 1920

| | Metropolitan District Railway | London Electric Railway | City and Sou h London Railway | Central London Railway | London General Omnibus Company | Total |
|---|---|---|---|---|---|---|
| Traffic receipts | (a) £2,472,614 | £1,716,476 | £353,104 | £525,083 | £6,533,951 | £11,601,228 |
| Operating expenses | 1,509,272 | 1,387,294 | 321,911 | 485,132 | 6,675,238 | 10,378,847 |
| Net receipts | £963,342 | £329,182 | £31,193 | £39,951 | * £141,287 | £1,222,381 |
| Miscellaneous receipts (net) | 205,508 | 134,936 | 32,309 | 73,317 | 247,928 | 693,998 |
| Gross income | £1,168,850 | £464,118 | £63,502 | £113,268 | £106,641 | £1,916,379 |
| Interest, rentals and other fixed charges | 327,371 | 286,266 | 49,619 | 54,071 | 108,583 | 825,910 |
| Net income | £841,479 | £177,852 | £13,883 | £59,197 | £1,942 | £1,090,469 |
| Reserve for contingencies and renewals | 45,000 | 45,000 | 25,000 | 20,000 | 285,000 | 420,000 |
| Dividend on guaranteed and preference stocks | ( )124,930 | 126,947 | 42,500 | 21,600 | ........ | 315,977 |
| Total deductions | £169,930 | £171,947 | £67,500 | £41,600 | £285,000 | £735,977 |
| Surplus paid into or drawn from common fund | £671,549 | £5,905 | (c) £53,617 | £17,597 | (c) £286,942 | £354,492 |
| Amount received from common fund | 42,539 | 106,348 | 21,270 | 70,898 | 113,437 | 354,492 |
| Per cent of total | 12 | 30 | 6 | 20 | 32 | 100 |
| Add balance from last year's accounts | 22,098 | 20,942 | 19,750 | 11,762 | 59,726 | 134,278 |
| Total amount available for dividends and further reserves | £64,637 | £127,290 | £41,020 | £82,660 | £173,163 | £488,770 |
| Dividends | 44,100 | 104,940 | 22,200 | 67,500 | 114,320 | 353,060 |
| Balance carried to next year's account | £20,537 | £22,350 | £18,820 | £15,160 | £58,843 | £135,710 |

(a) Including $705,347 from Government compensation after providing for adjustments.
( ) Exclusive of dividend on second preference stock.
(c) Deficit met out of common fund.

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* Deficit.

## Hartford & Springfield Road Doing Better

The committee representing the holders of bonds of the Hartford & Springfield Street Railway, Hartford, Conn., has expressed great satisfaction over the much-improved physical condition of the property and its present financial status, and has urged the continuation of the receivership. The members further suggested that bondholders refrain from sending in for payment the $600,000 of first mortgage 5s due on July 1.

The bondholders received a statement of operation from Receiver Harrison B. Freeman under date of June 10, 1921. In this report Mr. Freeman expressed the belief that the railway "can be made to earn its operating expenses, taxes and something to apply on bond interest as soon as the industrial depression has passed and there has been a readjustment so that operating expenses can be reduced."

The Hartford & Springfield Division went into receiver's hands in October, 1918. At that time it owed more than $50,000 in open accounts and had failed to pay interest on its bonds. Money had to be borrowed to keep the road going, but the company, despite the severe conditions imposed by the influenza epidemic and the coal shortage, weathered the gale so that now all notes have been paid and all bills up to June 1 have been met. Considerable money has been spent in replacement and more than $20,000 has been expended within the last two years in rolling stock. These various expenditures, together with a 50 per cent wage advance, have eaten pretty well into the company's finances, even though a flat 10-cent rate for each zone went into effect on April 1, 1920, instead of the 7-cent fare. The advance in rates helped materially at first to swell the gross receipts, but this favorable development was only temporary due to the present industrial depression. State taxes and assessments for highway improvements to the amount of $29,653 accrued from Oct. 1, 1918, to Jan. 1, 1921.

The accompanying statement shows the operating results of the receivership from Oct. 1, 1918, to May 1, 1921.

| Hartford & Springfield Division | Gross Receipts | Operating Expense | Hartford Division | Gross Receipts | Operating Expense |
|---|---|---|---|---|---|
| Oct., 1918–1919 | $245,675 | $235,942 | July 1, 1920–May 1, 1921 | $152,450 | $130,422 |
| Oct., 1919-1920 | 255,140 | 265,131 | Total system 31 mos. | 804,566 | 789,479 |
| Seven months to May, 1921 | 151,301 | 157,984 | | | |

## Deficit of $150,000 Accumulated Since 1913

The New Jersey & Pennsylvania Traction Company, Trenton, N. J., announces a deficit of more than $150,000 in operating its line from Trenton to Princeton since 1913, according to figures submitted by the company in the hearing of the application for a 10-cent fare before the Board of Public Utility Commissioners. It was shown that the company's property was valued by the commission in 1913 at $500,000 and again in 1916 at $575,000. Both sides agreed that the 1916 valuation would hold for the proceedings in the present case. The 6 per cent net return on this valuation, which the commission authorized, would mount to $34,000 a year. A deficit amounting to from $11,000 to $50,000 a year has accumulated since 1913. Last December the commission rejected the application to raise the fare from 7 to 8 cents and advised the company that an increased rate would be unlikely to solve its financial problems.

## Toledo Going Behind Steadily

With the stabilizing fund of the Community Traction Company, Toledo, Ohio, down to $183,333 after five months of operation it has been necessary to raise fares to 7 cents with tickets at eight for 50 cents or possibly six for 40 cents.

The report for the month of June made by Commissioner Wilfred E. Cann indicates a deficit of $32,963 after providing for operating expenses and allowances for various funds. This is a decrease of $1,406 from the previous month. The total accrued deficits so far amount to $313,634.

This sum will have to be made up by fare increases and savings in operations. The fare raise will not take effect before Aug. 1 because of a special provision in the ordinance which allows six months operation without a fare change.

A decrease in gross revenue from all sources of $13,663 is accounted for by the fact that riding has fallen off about 18 per cent and that June had one day less of operation than the previous month.

### OPERATING RATIO 85.47 PER CENT

There was a greatly increased expenditure on ways and structures during the month of June. A total of $49,811 was paid out for that work during the month. The ratio of operating expense to income fell to 85.47 per cent during the month, a decline of 2.01 per cent.

The commissioners are not pessimistic over the status of the operation of the lines. They believe that the restriction of buses which will soon be effective will divert about $16,000 revenue to the railway and that the decrease in power rate will net a saving of between $10,000 and $20,000 a month.

The bus ordinance is now in litigation. The Common Pleas Court was upheld during the week ended July 9 by the Court of Appeals and further action was expected on July 13 to bring the matter before the Supreme Court of the State for the final effort to set the measure aside.

## Financial News Notes

**Wants to Issue Bonds.**—The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has petitioned the State Public Utilities Commission for permission to issue $500,000 of 7 per cent secured sinking fund gold bonds and $98,400 of first mortgage bonds.

**$525,000 Sought to Be Recovered.**—Two suits seeking a total of $525,000 from the Ohio Traction Company and the Cincinnati Street Railway for franchise tax have been filed in the Hamilton County Common Pleas Court by Attorney Robert S. Alcorn as a taxpayer.

**Haytian-American Corporation in Difficulties.**—A petition in bankruptcy has been filed against the Haytian-American Corporation. The corporation has concessions from the Haytian government for the operation of railway and electric lines, electric light and power companies and a large sugar plantation in Hayti. James N. Rosenberg was appointed receiver in equity for the corporation last April.

**Overtures Made to Continue Line.**—The Lake Shore Electric Railway has been asked by citizens to abandon its plan of removing service on the Soldiers' Home and West Monroe Street lines in Sandusky. The service will be continued according to company officials provided a 10-cent fare is permitted to be charged on the Soldiers' Home line and a 7-cent fare on the West Monroe Street line. The present fare on other lines is 6 cents with five-for-a-quarter tickets.

**$1,000,000 of Transit Bonds Sold.**—The city of Cincinnati, Ohio, has sold to a syndicate composed of Halsey, Stuart & Company, the Guarantee Trust Company, the Bankers Trust Company, Stacy & Braun, the Fifth-Third National Bank and Ames, Emerich & Company, $1,000,000 of Cincinnati Rapid Transit Railway Construction 5¾ per cent bonds. They are a direct obligation of the city, mature Jan. 2, 1967 (optional 1942), and are being offered at 103.50 and interest, yielding 5½ per cent.

**"Let Your Service Pay You Dividends."**—The Public Service Corporation of New Jersey, Newark, N. J., reported on July 5 that its "Customer Ownership" campaign or its offering of 8 per cent cumulative preferred stock had aggregated subscriptions in the first four weeks of more than $1,000,000. The campaign was started on May 23. In the first four days 612 new partners were secured, and in the first four weeks this number was increased to more than 4,000. A detailed account of this offering was given in the ELECTRIC RAILWAY JOURNAL for June 4.

# Traffic and Transportation

## Jersey Case Carried Up

### Public Service Commission Appeals From Court Ruling Holding Present Fare Inadequate

The Board of Public Utility Commissioners of New Jersey has appealed from the decision of the Supreme Court of New Jersey in the 10-cent fare petition of the Public Service Railway. It will be recalled that the opinion of Justice Bergen in this case declared that the course followed by the commission was not warranted by the evidence. The commission now replies to the strictures by the Supreme Court upon its action in the 10-cent case.

### ORDER NOT WARRANTED

The commission says that the order of the Supreme Court was not warranted by law. Furthermore, the commission holds that the order of the court was in effect the legalizing of "all the bond issues of the Public Service Railway and all the rentals paid to subsidiary companies under lease," the valuations of which have never been determined by commission or court.

The third point made by the commission in its comment upon the Supreme Court decision is that the appeal to the Court of Errors will determine whether the fixing of a just and reasonable rate is a judicial or legislative function. It was expected that the board would announce by July 14 what it considered a just and reasonable permanent fare for the railway.

The commission sought immediate action on its appeal, but Chancellor Edwin Robert Walker declined to convene the Court of Errors and Appeals in special session to stay the judgment of the Supreme Court directing the commission to grant a higher rate of fare than 7 cents to the railway. L. Edward Herrmann appeared before the chancellor at the direction of the Utility Board. The chancellor stated that it would not be possible at this time, upon such short notice, to secure a quorum of the sixteen Errors Court members, as many of the judges are away.

### VALUATION BRIEF FILED

In a brief filed with the Public Utilities Commission on July 11 in the Public Service Railway valuation case, George L. Record, representing Jersey City, repeats his stand for the continuance of the 7-cent fare and asks that the Public Service be warned that if it wants greater return on its investment it must rely upon greater efficiency and economy in management. Mr. Record contended:

> The evidence shows that the Public Service is not entitled to any increase of fare, and that on the contrary the rapid fall in the price of labor and material will soon put the company where a reduction in the present 7-cent rate should be ordered.
>
> It is not fair that this company should be able to exact from the people who ride in the cars a tribute of $1,500,000 annually to pay interest upon securities that represent no invested value. The injustice of taxing forever people who are mostly poor in order to provide an unearned income to security holders who are mostly rich, is intolerable and in the long run can not in the nature of things continue.

The Cooley appraisal of the Public Service property is called "fanciful" and "absurd" by Mr. Record and the one made for the state by Ford, Bason & Davis fails also, he declares, because it is built up upon the same fanciful theory and because the value found depends entirely upon what rate the board should allow. Mr. Record contends for the $60,000,000 value offered by the municipalities.

## Six Cents Upheld

### State Supreme Court Reverses Lower Court Decision and Dismisses Attorney's Suit

The State Supreme Court of Louisiana in a recent decision ruled that Shreveport citizens must continue to pay a 6-cent fare until Dec. 31, 1923. This finding by Justice Provosty reversed the Caddo District Court and dismissed the suit of Huey P. Long, Jr., against the Shreveport Traction Company, asking that the 6-cent fare ordinance be declared illegal.

The Shreveport fare controversy dates back to May 18, 1920, when an election was held and a majority of votes cast favored the increase in fare from 5 to 6 cents.

The increase was contested by H. P. Long, an attorney at Shreveport and a member of the Louisiana State Railroad Commission. Having failed in his efforts to defeat the proposition on the day of the election, Mr. Long filed suit to annul the election, alleging certain irregularities in the proceedings of the Mayor and Council in calling the vote. The case was tried in February, 1921, and the District Judge sustained the contention that the irregularities were sufficient for an annulment. Mr. Long came out in public print advising people to pay only 5 cents. The railway advised the people that an appeal would be taken to the Supreme Court and that the fare would be 6 cents until such time as the Supreme Court should pass upon the matter.

In the course of a few weeks the number of patrons who insisted on paying only 5 cents grew to such proportions that the railway instructed its conductors to eject any passenger who failed to pay the full fare. As a result there was considerable confusion and the company compromised the matter by agreeing to issue coupons for 1 cent in case the higher court should sustain the lower court.

The case was argued before the Supreme Court on April 11 and decision was rendered on June 30 in favor of the railway.

## More Jitney Decisions

### Connecticut Commission in New Findings Reiterates Stand Taken in Hartford-Manchester Case

The jitneys heretofore operating in New Haven, Conn., have been denied certificates of convenience and necessity by the Connecticut Public Utilities Commission with the exception of three buses operating on a route that serves territory intervening between two car lines. This decision also largely prohibits jitney operation to surrounding towns either on account of adequate rail service or because permits have already been granted to other jitney operators.

In denying the applications between Branford and New Haven the commission suggests that the Connecticut Company establish a motor bus service in connection with its trolley lines to serve territory between East Haven and Branford, formerly fed by jitneys and now without other means of transportation.

With regard to the applications for permits to run to Bridgeport and Hartford the commission denied the petitions, holding that in each case there was adequate steam road service and that the routes were intended principally for through traffic and would only serve intermediate territory to a limited extent. However, on the New Haven-Bridgeport route the commission suggested that the Connecticut Company might operate a motor bus from New Haven via Milford to Devon and Allingtown over the main trunk highway, there being no other existing means of transportation, nor any application for this territory. In connection with the route to Hartford, over which large touring cars were run, the commission held the train service was adequate and further that inasmuch as the automobiles with reasonable safe speed took at least thirty minutes longer than the train, the duplicate service was not warranted.

The commission allowed the application for a bus route from New Haven to Waterbury via Bethany on the grounds of inadequate train service, but denied the through route to Waterbury via Ansonia and Derby. This last-named route is co-extensive with or parallels street railway service supplying intermediate points over its entire length. The route to Waterbury via Bethany, it was held, was the quickest, most direct and uncongested for through travel and for that reason the commission denied the applications for another through route via Derby.

**Business Men Ask for Cheaper Fares.**—At the monthly meeting of the Allied Boards of Trade of Pittsburgh, Pa., on June 15 constituent organizations through their delegates reported that they had approved resolutions adopted last month by the Allied Boards, calling for a lowering of railway fares in Pittsburgh. The committee on better service was instructed to bring this matter before City Council and the Public Service Commission.

## More Municipal Buses

### Hylan Administration in New York Establishes Routes Over Grand Concourse

The Emergency Bus System, so-called, of the Department of Plant and Structures, New York, started operation on Sunday, July 3, over an 8-mile line for a 5-cent fare along the Grand Concourse in the Harlem and Bronx districts of upper New York City. Nine two-man doubledeck buses, seating fifty passengers each and mounted on Diamond-T chassis, comprised the original fleet put into service. Eleven more buses are soon to be added. Five of these will be of the same design while the other six will be mounted on a Packard chassis with body patterned after that of the London bus.

### ORIGINAL ROUTE EXTENDED

The original bus route extends from 110th Street and Fifth Avenue north via Fifth Avenue, Morris Parkway, Madison Avenue, Mott Avenue, and the Grand Concourse to Mosholu Parkway at 207th Street, a distance of 8.3 miles. The buses are run on a ten-minute headway so far as possible. As soon as additional equipment is received, it is planned to open up another route from Fort Lee Ferry thence via 126th Street to Fifth Avenue and to sandwich in with the first-named route so as to give a five-minute schedule over the Concourse. These routes do not operate except for about a half mile on streets occupied by trolley car tracks and then only to cross the Madison Avenue Bridge.

This bus system is the result of action taken by the Board of Estimate on July 1, 1921, granting to Emil Leindorf, owner of the Concourse Bus Line, Inc., permits to use the above streets for motor bus traffic. Operation is under the direction of the City Department of Plant and Structures, and that department furnishes starters and police to man the queue loading areas established at the bus terminals.

The actual running time for a one-way trip took fifty-one minutes, without including any loading time at the terminals. Under the plan of operation all buses must unload before starting on the return trip so as to give those waiting in the queue a chance to get aboard in their turn according to the number of seats operated. Stops per mile will vary from six to eight. This gives an average speed of 9.75 m.p.h.

The streets over which the buses operate could not be better so far as the paving is concerned. There is less than a mile of granite block paving, some of which is grouted, while the balance is either asphalt or bitulithic macadam. The amount of vehicular traffic which the buses have to contend with is heavy inasmuch as the major portion of the route passes over one of the main arteries for automobile traffic out of New York City for points north and east. This, however, is not as slow moving as the buses themselves for the Concourse has two one-way traffic lanes each wide enough to accommodate three traffic streams without difficulty and the speed limit is not strictly enforced.

The traffic handled during the first few days of operation averaged from 15,000 to 20,000 a day of nineteen hours. Buses for the most part were filled to capacity and it was with difficulty that the no-standing rule was enforced.

FLEET OF BUSES SERVING TERRITORY NOW WITHOUT RAILWAY FACILITIES

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## Three-Cent Fare Advocated

Councilman Oliver T. Erickson of Seattle, Wash., is sponsor for a 3-cent fare initiative ordinance to be introduced at the spring election next year. Mr. Erickson's proposal is to charge a fare on the Seattle Municipal Railway sufficient to pay interest and redemption charges on the $15,000,000 of bonds issued to Stone & Webster in payment for the lines bought by the city two years ago, and then meet the cost of maintenance and operation of the lines out of taxation.

City officials have joined with business men in condemning the measure. Mayor Hugh M. Caldwell stated:

> I have never thought favorably of the 3-cent fare plan. I think it would hurt the city.

Councilmen John E. Carroll and A. Lou Cohen have gone on record as flatly opposing it, and other members of the Council have similarly expressed themselves. Others hold it would ruin the credit of the city.

## Birmingham Case Closed

### Commission Expected to Rule Within Thirty Days on Eight-Cent Fare Plea

Hearings on the application of Lee C. Bradley, receiver for the Birmingham Railway, Light & Power Company, Birmingham, Ala., for an 8-cent fare with a 2-cent transfer charge and an application to keep the present electric light schedules in effect, eliminating an automatic reduction in rates, were held before the Alabama Public Service Commission on July 7 and 8.

Testimony before the commission was completed on the night of July 8 and the case was taken under advisement pending the filing of a budget for the last half of the year by J. S. Pevear, president of the company, and general manager of the property under the receiver. Mr. Pevear is also to file estimates of the receipts of the property for the last half of the year based on the present rate and on the advanced rate. Similar estimates are to be furnished by I. W. Ross, consulting engineer for the city of Birmingham. Efforts of the receiver to secure the advance in fares were strongly contested by the city.

Mr. Pevear for the company stated that the increase was necessary in order that the company continue to operate and render proper service. I. W. Ross, witness for the city, maintained that the present 7-cent fare is adequate and that by making a traffic survey, rerouting and effecting certain economies the condition of the property can be improved. In the arguments Mr. Bradley, the receiver, declared that the raise must be granted or the property will have definitely turned back toward the conditions of 1918 when there was an almost total break down in the service. Mr. Johnston maintained that the company should be re-organized and that the additional money needed should be supplied by the stockholders. He contended that about $2,000,000 in new money should be put into the property and stated that a large part of the heavy expenditures of the receiver represent deferred maintenance and capital investments which should not be gotten from the people in increased fares.

Mr. Pevear outlined the improvements made by the receiver. Twenty-five new one-man cars were bought, 144 motors were installed in old cars which were rebuilt. Trailers were bought and the work of rehabilitating the track was begun. During the receivership, he testified, only the preferred creditors have been paid and all other money has been put back into the property. He stated that the receiver has spent approximately $2,297,000 in rehabilitation.

Testimony was given to the effect that the number of revenue passengers now using the railway is about the same as in 1913. An exhibit was filed showing that for 1920 there was an increase in comparison with 1913 of 287 per cent in current sold, 115 per cent in gas, and 32 per cent in the number of revenue passengers handled. In May, 1921, the comparison with May, 1913, shows a 253 per cent increase in current, 150 per cent increase in gas, and a 5 per cent increase in the number of revenue passengers handled. Mr. Pevear testified that railway mileage is the same as in 1915, more cars are in operation and better service is being given, but no more people are riding.

An exhibit was filed showing that in May, 1921, a total of 110,500 revenue passengers were handled as against 140,500 in May, 1920. Exhibits were also filed showing that since 1913 the average wage of the company has increased from $64 a month to $120. Operating costs of the street railway were shown by another exhibit to have been reduced from 23 cents per car mile in January to 20.1 cents per car mile in May, 1921. This compares with 21.4 cents per car mile in May, 1920. Other exhibits filed showed economies effected and savings made in the shops and a general financial statement.

Cross examination of Mr. Pevear by Mr. Johnston lasted for practically a whole day. Mr. Pevear testified that the property was in fair condition in 1913 and 1914 and that it went down to a point of practical collapse during the war. The property he testified has now been put in good condition. The common stock had not paid a dividend in years and the preferred has paid only 9 or 10 per cent where 42 per cent is due.

Mr. Ross was put on the stand for the city. The most salient features of his testimony were strong recommendation for a traffic survey and rerouting of lines in the business district. He stated that the introduction of an express service to suburbs with local cars for the nearer in traffic would effect a saving. He also recommended the abandonment of a portion of the Tidewater tracks and a rerouting of a portion of that line. He expressed the opinion that a 7-cent fare is adequate in Birmingham. He filed a lengthy statement in the form of an exhibit showing the results of his study of the property which has covered several months.

Following the close of the testimony the commission indicated that it would probably rule within thirty days.

### Wants Five-Cent Fare Restored

It was recently stated by Corporation Counsel Lewis that the City of Syracuse would take steps immediately after Nov. 1 for a return of the 5-cent fare on the lines of the New York State Railways in that city. On that date the time will expire in which the city was prevented by the former Public Service Commission from filing a demand for a 5-cent fare.

The reduction will be asked on the ground that the company has installed changes which have greatly reduced the cost of operation and also that the 8-cent fare was not justifiable from the evidence submitted. Mr. Lewis will also petition the Public Service Commission to act on the one-man car issue. He wants a survey by a state expert as many complaints have been made about this method of operation in Syracuse.

### Commission Grants Fare Increase

In a decision handed down June 25, 1921, the Wisconsin Railroad Commission granted permission to the Wisconsin Traction, Light, Heat & Power Company operating an interurban electric railway between Neenah and Kaukauna and a street railway in Appleton, to increase its city and interurban electric railway fares. The application for an increase was filed in October, 1920, on the ground that the increases in operating costs has been so large that a fair return on the property was not being earned. The case was heard by the commission in November, 1920, but action on the application was withheld by the commission, until the company made substantial progress towards bettering its gas service.

On Jan. 7, 1921, satisfactory evidence as to progress towards better gas service having been shown, the commission proceeded with the consideration of the case with the result that an increase in railway fares was granted. The cash fare within the city fare limits of Appleton, Neenah-Menasha and Kaukauna was increased from 5 cents to 7 cents; children 3 to 10 years who used to pay half-fare or 2½ cents will now pay 4 cents. The following ticket rates were established: eight tickets for 50 cents good for any 7-cent fare on system; twelve tickets for $1, good for any 10-cent fare on system; books of twenty-five tickets for $4, each ticket good for any 20-cent fare on the system and in addition good for transportation between Neenah and Appleton or between Kaukauna and Appleton with transfer privilege to and from city cars in Appleton. The company was also granted increases in interurban cash rates of fare.

**Wants Interstate Rate Raised.**—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has petitioned the Public Service Commission of Indiana for an increase in its Indiana rates to the Illinois-Indiana interstate rate level.

## Transportation News Notes

**Print Transfers for Car Changes.**—Rerouting the street car lines at Memphis made necessary an initial order for 16,240,000 transfer tickets, requiring twelve tons of paper, according to E. W. Ford, general superintendent of the Memphis Street Railway. For each of the twenty-three lines on which the routing has been changed a new transfer ticket must be provided. Mr. Ford said that the date for starting the new routing awaits the completion of track work.

**Nashville Survey Expected Soon.**—The traffic survey of the city of Nashville which is being made by Ross Harris, traffic engineer for the city and the Nashville Railway & Light Company, is expected to be completed within the next month. A preliminary report has been published showing statistics of the city but no recommendations will be made until the survey is complete. At present the main thoroughfares of the city are very much congested during the rush hours. One-way traffic is in force on a great many of the principal streets.

**Supreme Court to Decide Jitney Issue.**—Jitney operators of Atlantic City, barred from driving machines unless they are owners of the cars, will carry the new ordinance which went into effect on June 13 into the New Jersey Supreme Court on a writ of certiorari in an effort to prove it unconstitutional. Under the provisions of the act before the present amendment, the city issued 125 licenses to operators, giving ex-service men first call. It has been charged by the city that scores of drivers were reckless in operating cars. Repeated warnings failed to break up this condition and the law was amended to permit only owners to drive. Many jitneymen were thrown out of employment by the new ordinance.

**Discrimination Charged in Utah.**—The Salt Lake & Utah Railroad, Salt Lake City, Utah, complainant against the Utah Railroad, has filed its brief with the Public Utilities Commission of Utah, in which it is alleged that the acts of the defendant violate sections of the compiled laws of Utah of 1917 and sections of the public utilities act. These acts, it is alleged, constitute a discrimination against the Salt Lake & Utah Railroad and shippers in that a greater amount is charged by defendant's tariffs for carriage of coal via the Salt Lake & Utah road than is charged for identical service via the Salt Lake route. The Utah Railroad has ten days in which to file its brief with the commission, the case having been presented on May 4, and taken under advisement by the commission, both parties to submit briefs in the matter.

# Personal Mention

## Newspaper Man in Charge of Utility Information Service

Linton K. Starr, assistant city editor of the *Atlanta Journal*, announced his resignation recently to become executive secretary of the newly formed Georgia Committee on Public Utility Information. He will have direction of the committee's activities, which, it was announced, will be to develop friendlier relationship between the public and corporations serving it by acquainting the one with the problems and purposes of the other.

Mr. Starr undertakes the work of the committee with the advantage of a wide experience, not only in the newspaper profession, but in publicity and public relations work of all kinds. A native Georgian, a graduate of Emory University and a former student of Johns Hopkins University, he has lived practically all his life in Georgia and has been familiar from boyhood with the state and its people.

Mr. Starr has been a close student of public relations for many years. During the war he conducted an extensive campaign for the government to arouse interest in and encourage the support of the selective service law in Georgia. His other work has included publicity for Emory University, various conventions and a number of business enterprises. He is an experienced advertising writer.

In its initial statement the committee expressed its views and intentions by saying that "We believe that the utilities have reached a period demanding, first, the highest possible standard of service to the public; and, second, the full understanding by the public of the problems of utilities, which, after all, are the problems of the public."

## A. LeRoy Hodges Promoted on the Brooklyn City Railroad

A. LeRoy Hodges was recently appointed assistant secretary and assistant treasurer of the Brooklyn (N. Y.) City Railroad, where, until this promotion, he had been in charge of the statistical work in connection with the operation of the surface lines.

Mr. Hodges' first railway connection was with the Westchester, Kennett & Wilmington Railway, Kennett Square, Pa., as secretary to the general manager, a position he took after a business education in Albany, N. Y. Leaving this property in 1908, he was employed by the General Electric Company as secretary to the assistant manager of the switchboard department. In 1911 Mr. Hodges left Schenectady to accept an appointment as secretary to A. W. McLimont, then vice-president and general manager of the Michigan United Railways, Jackson, Mich.

Upon the leasing of this property to the Commonwealth Power, Railway & Light Company he was appointed chief clerk to C. E. Morgan, general superintendent of the Michigan Railway, and continued in this capacity until Nov. 1, 1919.

## J. W. Welsh Secretary

### Special Reorganization Committee Recommends that A. E. R. A. Engineer Be Made Secretary

As is indicated elsewhere in this issue, J. W. Welsh, special engineer of the American Electric Railway Association, and acting secretary since the resignation of E. B. Burritt in March of this year, has been recommended by the special reorganization committee as the permanent secretary. For the past two years as special engineer of the association, Mr. Welsh has conducted studies and investigations of special subjects and has had charge of the information service of the association. Under his direction the Bureau of Information and Service has rendered valuable aid to the industry.

J. W. WELSH

It is the function of this bureau to compile information concerning all phases of electric railway operation. By means of it members of the association are kept informed of the latest developments in the fare situation throughout the country, wages and working conditions, trend of regulation, valuation, franchise requirements, operating methods, operating economies, effect of increased rating of fare, developments in the operation of safety cars, etc. In addition to this direct service to the member companies, the bureau has also prepared statistical data for and otherwise has assisted the various standing committees of the association, *Aera*, and the publicity department.

During each of the past two years Mr. Welsh, as a special lecturer of Yale University, has given a series of lectures on electric railway problems to Yale graduate engineering students.

Until his appointment as engineer of the association, Mr. Welsh was in Washington, D. C., associated with A. Merritt Taylor, manager of the passenger transportation of the Emergency Fleet Corporation of the United States Shipping Board. Mr. Welsh, who served on Mr. Taylor's staff, assisted in providing transportation facilities to the various shipyards on the Atlantic and the Pacific Coast as well as correcting existing shortcomings where they were present. Previously Mr. Welsh was electrical engineer and traffic agent of the Pittsburgh (Pa.) Railways, with which he became associated in 1906 as assistant electrician. In 1910 he was made electrical engineer and in 1913 took charge of the traffic department. Some of his earlier electrical engineering experience was gained in the employ of the National Tube Company, Wheeling, W. Va., and also in the Westinghouse Electric & Manufacturing Company at East Pittsburgh.

Mr. Welsh was graduated from Wittenberg College in 1900, Harvard University in 1901, and Massachusetts Institute of Technology in 1903.

**J. V. Granger** has been elected vice-president of the Tidewater Power Company, Wilmington, Del., in which office he succeeds H. C. McQueen.

**R. Knecht** has recently become master mechanic of the Indiana (Pa.) County Street Railways, succeeding William Kinter.

**S. G. Shaw**, supervisor of safety on the Denver & Intermountain Railroad, Denver, Col., was recently appointed claim agent. W. C. Simonds has joined the staff of the property with the title of purchasing agent. This position was formerly held by W. S. Brackett. The two first-mentioned men hold like positions respectively with the Denver Tramways Company.

# Obituary

**Francis B. Crocker**, founder of the Crocker-Wheeler Company, died on July 9 at the age of sixty-one. His most important contribution to the electrical industry was work done in making the electric motor a commercial success. His teaching as founder and head of the school of electrical engineering of Columbia University contributed much to the growth and importance of the electrical development of this country. It was his aim to bring about standardization in the electrical industry and as the first chairman of the standardization committee of the American Institute of Electrical Engineers, his painstaking work earned for him much commendation. He was a past-president of the American Institute of Electrical Engineers, the Electric Power Club and the New York Electrical Society.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT
ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Improvement Expected in Track Material

### Market for First Half Year Has Been Very Quiet—Deliveries Are Immediate

The market for track material such as spikes, bolts and nuts should show improvement in the fall months, according to the opinion of producers. It is generally conceded that present buying is no better than the poor demand existent all the first half of this year. There are some inquiries out from steam roads as though they were feeling out the market, but actual orders are scarce.

Electric railway business is flat, but some of the lines in the Middle West have inquiries on the market for creosoting ties, which may be the first step in track construction work. Both steam and electric roads have been out of the market for so long that it seems conditions of demand cannot help but improve. The chief retarding factor, it is felt, has been high labor costs, and this now seems to be on the road to being remedied. Export sales are dead, and prospects there are uncertain as this market is largely contingent upon large world affairs.

Jobbers of this class of material are buying from hand to mouth and generally have low stocks. Manufacturers, however, still have considerable supplies of cancelled material on their hands and are able to make immediate shipments, though manufacturing operation is at a very low point. Some producers who make only bolts and nuts are closed down entirely, though as recently as late last summer production was two to three months behind on spikes and as long as six months on bolts and nuts.

The current base price on standard railroad spikes and track bolts has receded about ¼ cent in view of the recent drop in steel. In car lots spikes are now quoted at 2.90 cents to 3 cents per pound and track bolts at 3.80 to 4 cents. These price reductions are generally expected to improve buying.

## Brill Has Built 2,961 Safety Cars to Date

The J. G. Brill Company and its subsidiary companies, the American Car Company and Wason Manufacturing Company, have received orders to date for a total of 2,961 Birney safety cars, according to the June, 1921, issue of the *Brill Magazine*. With the exception of those still in the course of construction, shipments of these cars have been made to 168 street railways in the United States, Canada, Mexico, South America, New Zealand and Holland. Indications are, it is stated, that light-weight, one-man-operated safety cars will very rapidly be installed in service in practically every country in the world. Up to the first of this year a total of 4,193 safety cars had been ordered by companies in this country and Canada, statistics compiled by the ELECTRIC RAILWAY JOURNAL show. This total covers the five-year period previous to the present year as this type of car was practically unknown before 1916, when 187 safety cars were purchased.

## Steel Cut Brings Price Drop in Electrical Items

### Conduit, Outlet and Switch Boxes and Locknuts and Bushings Are Reduced This Month

Following general reductions in the price of steel products that were made recently, lower quotations have resulted on a number of electrical steel products. Effective July 7 the U. S. Steel Corporation reduced the price of standard steel pipe from the discounts shown on its April 13 card as follows: ¼-in. and ⅜-in., 1 point or $2 per ton; ½-in. to 6-in., 2 points or $4 per ton; and 7-in. to 12-in., 3 points amounting to $6 per ton.

Effective July 11 a number of leading manufacturers of electrical conduit also reduced prices by increasing the discount allowed distributers, at the same time advancing the number of their base card by one. The decrease amounted to 9 points on black and galvanized conduit in some instances and 5 points in others. The difference of 4 points is accounted for by earlier price reductions on the part of those who at this time dropped the least, so that base prices are said to be approximately on the same level. Sizeable stocks are reported by manufacturers, with keen competition for orders and generally quiet conditions of demand.

In line with the drop in the price of base sheets, outlet box quotations have been generally reduced 11 per cent on black and 10 per cent on galvanized. The drop became effective on various dates ranging from June 27 to July 11, and was made by increasing the discount 5 points in each case.

Locknuts and bushings were reduced approximately 29 per cent by manufacturers during the same period as the price decrease noted above. The discount to jobbers in standard packages was increased 10 points.

Switch box prices are also down, the drop in several instances there becoming effective around the first of the month. The amount of the decrease varied with different manufacturers, ranging from 11 to 35 per cent.

## Secretary Hoover Optimistic on Trade Situation

### Although Exports Are Lower in Value, He Foresees Slow Increase Under Better Economic Operation

In an address in Boston on July 12 Herbert Hoover, Secretary of Commerce, in discussing the foreign and domestic business situation, said that although our exports and imports had dropped nearly 50 per cent in value from the high water mark of a year ago, more of this decrease was due to the fall in prices than to a decrease in volume, and that with Russia not exporting food he saw no reason why we should not continue to export approximately the same volume of foodstuffs that we have shipped abroad during the past six months. This item alone, he said, even at present prices would be triple our pre-war food exports and would represent the equal of more than 60 per cent of our whole pre-war export trade. He thought also that the demand for our raw materials would slowly increase toward pre-war amounts and that our manufacturers should be able to hold special fields for repetitive production and ingenuity. He expected we would have to make an effort to hold the market for manufactured goods wherever we come more directly into competition with the European manufacturer, but that we can do it if we will work and apply our brains to it.

On the financial side of our situation he expressed the belief that our world credit situation is not so serious as to require extraordinary solution. The real cure for this depression as all other depressions is courage and applied intelligence, and the return to primary virtues of hard, conscientious toil and economy in living. On every side there is evidence that the vast majority of our nation is making a gain in effort in those directions equaled only by that of 1918, and the day some months ago when we entered this effort we fundamentally turned the corner of this depression. While our recovery may be slower than some may expect nothing can prevent the prosperity of a country where the people have enlightenment, wish to work, wish to produce and wish to do right by their neighbors.

## New York Retail Cement Price Down to $3

### Producers Hold Sufficient Stock to Make Prompt Shipments, Though Production Is Low

Activity in the market for cement continues on the same quiet level as heretofore. Electric railways are buying very little and demand from other sources, such as steam railroads or the building trade, has not picked up appreciably. Early this year, in view of the low production of cement, it seemed possible that deliveries might become pushed if building work started up as was expected. At present there seems little chance of a shortage developing, however, despite the fact that production is still down very low. Dealers are existing from hand to mouth but producers have a fair surplus quantity, which insures immediate deliveries. Manufacturers apparently believe that the situation will drift along on its present quiet plane for a few months, with some activity in the field of residential construction work but very little in other classes of building.

Producers' prices have held steady since last April, when a cut of 60 cents per barrel was made, but meanwhile retail quotations have continued to drop. At the time producers lowered prices last April New York dealers were quoting $3.50 per barrel. This has since dropped to a nominal price of $3.20 per barrel, but at the same time prices are being cut to $3, though some interests refuse to sell as low as that. The peak price of cement was $5.20 per barrel, New York, in effect last November.

## Rolling Stock

**Tampa Electric Company, Tampa, Fla.,** has placed an order for twelve more Birney safety cars for the Tampa service to be delivered in time for the next tourist season. General Manager Thomas J. Hanlon, Jr., announces. The company placed a previous order for eight safety cars with J. G. Brill Company in February, 1920.

**Pacific Electric Railway Company, Los Angeles, Cal.,** received ten new all-steel, multiple-unit, interurban motor cars in Los Angeles on July 5. These cars, which were described on page 393 of the August 21, 1920, issue, are the first installment of thirty ordered in July, 1920, from the Pullman Company. Delivery was delayed by two fires in the Pullman works, which destroyed a large amount of construction material. Twenty of the cars are equipped with four motors of 150 hp. each, the cost of the motor cars being $46,000 each. The remaining ten cars are trailers, costing $25,000. The ten motor cars yet undelivered are expected to arrive within a few weeks, followed by the trailers. The new cars, which weigh 57 tons each, will be distributed on the Long Beach, San Bernardino and other lines of the company where traffic is heavy, the intention being to transfer the cars now in use to other divisions of the system.

**Detroit (Mich.) Municipal Railway,** mentioned in the June 18 issue as asking for bids on 100 safety cars and fifty Peter Witt cars, has this week placed orders for these. Information just issued on the Peter Witt cars is given below. Specifications on the safety cars are as shown below:

| | |
|---|---|
| Number of cars ordered | 50 |
| Date of order | July 12, 1921 |
| Delivery | November |
| Builder | G. C. Kuhlman Car Company |
| Type of car | Peter-Witt, Detroit Safety Type |
| Seating capacity | 56 |
| Weight, total | 36,000 lb. |
| Length over all | 48 ft. 1 in. |
| Truck wheelbase | 5 ft. 2 in. |
| Width over all | 8 ft. 2 in. |
| Height, rail to trolley base | 11 ft. |
| Body | Steel |
| Interior trim | Cherry |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | G.E. C.P. 27 |
| Axles | 4½-in. A.E.R.A. Standard |
| Bumpers | Hedley Anti-climber |
| Car signal system | Faraday Buzzers |
| Car trimmings | Statuary Bronze |
| Center and side bearings | Perry-Hartman |
| Control | K-3562, with door contacts and line switch |
| Couplers | Metropolitan |
| Curtain fixtures | Curtain Supply No. 88 |
| Curtain material | O'Bannon D.C., No. 076 |
| Designation signs | Keystone |
| Door operating mechanism | National Pneumatic at center doors |
| Fare boxes | Johnson |
| Fenders or wheelguards | H.B. |
| Gears and pinions | G.E. Long Adendum tooth, solid |
| Hand brakes | Peacock |
| Heater equipment | Cutler-Hammer |
| Headlights | Golden Glow, No. 96 |
| Journal boxes | M.C.B. |
| Lightning arresters | G.E. |
| Motors | G.E. 265—35-hp., 4 per car, inside hung |
| Paint | Sherwin-Williams, Old Dutch, enamel |
| Registers | International R-7, air-operated |
| Sanders | Osgood-Bradley sand traps |
| Sash fixtures | O. M. Edwards Company, 13½ D1 |
| Seats | Brill |
| Seating material | Rattan |
| Step treads | Feralun |
| Trolley catchers or retrievers | Ohio Brass Company |
| Trolley base | Ohio Brass Company |
| Trolley wheels or shoes | Ideal, 4½ in. |
| Trucks | Brill, 77 E1 |
| Ventilators | Garland |
| Wheels | Steel, 26 in. |
| Special devices, etc. | Nichols-Lintern Tail Light, Duplex Safety Car Devices Equipment like that used on safety cars, controlling front door and interlocking center doors. |

## Track and Roadway

**Southern Pacific Company, San Francisco, Cal.,** received bids in the office of the purchasing agent up to July 14 for track bolts and spikes.

**Tampa (Fla.) Electric Company** is planning to double-track about 2 miles of its line.

**East St. Louis & Suburban Railway, East St. Louis, Ill.,** will not be able to make the improvement as requested by the city of Belleville, O. W. H. Sawyer, president, stated that $30,000 had been appropriated for maintenance in the city during the year and that this amount would not cover extended enlargements demanded. Members of the Belleville Council will consider paving West Main Street by assessment and will compel the railway to install double tracks between the Public Square and the Southern Railway crossing.

**Indiana Service Corporation, Fort Wayne, Ind.**—Owing to poor business conditions the proposed big truck plant which is to be erected just east of Fort Wayne, Ind., by the International Harvester Company has been postponed for about a year. But the Greater Fort Wayne Development Company—a million dollar concern—which was formed among Fort Wayne business men to build homes, etc., is going ahead with plans already formed for putting in streets for the plant. One of the things which the development company is pushing right along is the extension of the car lines of the Indiana Service Corporation to the plant. Recently a remonstrance was filed by residents of Pontiac Street against the double tracking of that street, so another route to the plant east of the city is being considered.

**The Public Service Railway, Newark, N. J.,** will shortly begin to lay Belgian blocks along the tracks from Bordentown, N. J., to Black's Creek.

**Cincinnati (Ohio) Street Railway,** has submitted proposals to the Cincinnati Traction Company for a loan of $650,000 to finance improvements which will include the proposed extension of the Warsaw Avenue line. Director of Street Railways, William Jerome Kuertz, disclosed this fact recently to a delegation of citizens who called on him for information in regard to the above mentioned extension.

## Power Houses, Shops and Buildings

**Boston (Mass.) Elevated Railway** has signed a lease with the Boston Transit Commission for the construction and operation of an underground tunnel station at Maverick Square, East Boston, the end of the East Boston tunnel. At present the cars run up an incline and radiate to the various surface lines. When the new station is constructed train service will be operated through the tunnel and passengers will change to surface cars at this point. The estimated cost of this station will be $1,650,000.

**Hudson & Manhattan Railroad** is purchasing all its energy from the New York Edison Company. This company took over the power plant located at Washington and Bay Streets, Jersey City, New Jersey. It contains four turbo-generators with a total capacity of 8,000 kw. The plant was built in 1910.

## Professional Note

**Ford, Bacon & Davis,** consulting engineers, New York, have opened an office at 1421 Chestnut Street, Philadelphia. At this office the firm is prepared to render services in the way of making valuations, engineering reports, superintending construction, conducting management of public utilities and industrial properties and preparing financial programs. The office in Philadelphia is in addition to the offices at 115 Broadway, New York, and at 58 Sutter Street, San Francisco.

## Trade Notes

**The Esterline-Angus Company, Indianapolis, Ind.,** has developed a portable concentration meter for showing the degree of concentration of chemical salts in water.

**W. H. Bloss** of the executive sales department of the Ohio Brass Company at its main office, Mansfield, Ohio, died at his home in that city on June 22. Mr. Bloss had been with the company continuously since 1906 and for the past year had been in charge of steam railroad electrification for the company. Previous to that he was in charge of sales for the central district.

**The Mica Insulator Company, 68 Church Street, New York City,** has developed a flexible oiled cotton tube for withstanding high temperature in electrical machine and instrument winding.

**J. R. Crawford,** general sales manager of the Union Carbide Sales Company, has succeeded N. C. Catabish as general sales manager of the National Carbon Company, Inc., Cleveland, Ohio.

**P. L. Laughlin,** assistant district sales manager of the Verona Tool Works, Chicago, has been made district sales manager, succeeding John B. Seymour, who assumed the office of sales manager Superior Supply Company, Chicago, last month.

**Jeffrey Manufacturing Company, Columbus, Ohio,** manufacturer of conveying, elevating, crushing machinery, etc., has moved its New York office from 50 Dey Street to 30 Church Street. Harold B. Wood has been made district sales manager, succeeding F. C. Ayers, who has left the company.

**The International Register Company, Chicago, Ill.,** through its sales agent the Electric Service Supplies Company, has leased 112 International portable hand registers to the Third Avenue Railway Company, New York City. These registers are attached to the fare box and used as an additional check on fares. About 250 of them were also placed with the Public Service Railway Company, Newark, N. J., earlier this year, for use on its safety cars.

**The Worcester Electric Tool Corporation, Worcester, Mass.,** has recently been organized to take over the business of the Stenman Electric Valve Grinder Company, Inc., the Stenman Electric Tool Company and the Consolidated Machine Tool Company, all of Worcester. The principal products of the company for the present will be the "HusKee" three-in-one combination service tool and the "HusKee" service drills. These tools have been on the market in a small way for the past six months and are the result of over two years' development work. The officers of the company are: H. P. Gleason, president; A. G. Sandberg, treasurer; J. J. Kelleher, sales manager, and Harold Raine, advertising and service manager.

## New Advertising Literature

**Pneumatic Tool Accessories.**—Ingersoll-Rand Company, 11 Broadway, New York City, has issued a twenty-four-page booklet illustrating and describing its line of "Little David" pneumatic tool accessories.

**Fire Fighting Equipment.**—The Oil Conservation Engineering Company, Cleveland, Ohio, has issued a pamphlet on "Electric Light and Power Plant Fire Protection," which describes the "Oceco" 10-gal., non-freezing fire extinguisher.

**Track Equipment.**—A. C. Callon, Portland, Ore., dealer in cars, rails and other railway equipment, has issued No. 117 of "Callons Bulletin," dated June 1921, which lists various quantities of new and relaying rails, frogs, switch points, track bolts, spikes and other equipment.

## *RESERVE*
## *Braking Power*

# PEACOCK
# STAFFLESS
# BRAKES

## "Why your safety cars should have them"

A moment's thought will convince you that when you buy BRAKES you are actually paying for BRAKING POWER.

Hence the folly of buying brakes calculated solely for the weight of the Safety Car itself—or the car plus a limited number of passengers. For invariably the time comes when the weight to be braked exceeds the limits of such brakes.

The Peacock Staffless has immense reserve power. You can install it on your Safeties with a 16-in. handwheel and it will develop 1,066 pounds braking power, or by using a 20-in. wheel the power can be increased to 2000 lb.

You will find that the braking power obtainable from the Peacock Staffless is 3 times that usually obtained from the ordinary handbrake under the same conditions. You will find it to be the lightest brake, and the one which occupies the minimum platform space on safety cars.

Mr. Executive! Use cold figures, not guesswork on your brake problem.

**NATIONAL BRAKE COMPANY**
**890 Ellicott Square**
**Buffalo, N. Y.**

# Bankers and Engineers

**Ford, Bacon & Davis**
115 BROADWAY, NEW YORK
Detailed Examinations by Experts
REPORTS FOR FINANCING COVERING
Costs Valuation Reserves Turnover Rates
UTILITIES INDUSTRIALS SHIPPING

**STONE & WEBSTER**
Incorporated
EXAMINATIONS REPORTS VALUATIONS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
NEW YORK BOSTON CHICAGO

**SANDERSON & PORTER**
ENGINEERS
REPORTS, DESIGNS, CONSTRUCTION, MANAGEMENT
HYDRO-ELECTRIC DEVELOPMENTS
RAILWAY, LIGHT and POWER PROPERTIES
CHICAGO NEW YORK SAN FRANCISCO

**THE ARNOLD COMPANY**
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

**ALBERT S. RICHEY**
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

**Parsons, Klapp, Brinckerhoff & Douglas**
WM. BARCLAY PARSONS H. M. BRINCKERHOFF
EUGENE KLAPP W. J. DOUGLAS
*Engineers—Constructors—Managers*
Hydro-electric Railway Light and Industrial Plants
Appraisals and Reports
CLEVELAND NEW YORK
743 Hanna Bldg. 84 Pine St.

**C. E. SMITH & CO.**
*Consulting Engineers*
2065-75 Railway Exchange Bldg., St. Louis, Mo.
Chicago Kansas City
Investigations, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Power Plants

**HEMPHILL & WELLS**
CONSULTING ENGINEERS
Gardner F. Wells John F. Layng Albert W. Hemphill
*APPRAISALS*
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

**THE J. G. WHITE ENGINEERING CORPORATION**
*Engineers—Constructors*
Industrial Plants, Buildings, Steam Power Plants, Water Powers, Gas Plants, Steam and Electric Railroads, Transmission Systems
43 Exchange Place, New York

**JOHN A. BEELER**
OPERATING, TRAFFIC AND RATE INVESTIGATIONS
SCHEDULES—CONSTRUCTION—VALUATIONS
OPERATION—MANAGEMENT
52 VANDERBILT AVE., NEW YORK

**ENGELHARDT W. HOLST**
*Consulting Engineer*
Appraisals, Reports, Rates, Service Investigation, Studies on Financial and Physical Rehabilitation
Reorganization, Operation, Management
683 Atlantic Ave., Boston, Mass.

**SANGSTER & MATTHEWS**
*Consulting Accountants*
Valuation and Rate Specialists
Depreciation Consolidations Rate Schedules
Reports to Bankers
101 Park Avenue, NEW YORK
134 South LaSalle Street, CHICAGO

**ROBERT M. FEUSTEL**
CONSULTING ENGINEER
Rate, Traffic and Reorganization Investigations
Fort Wayne, Indiana

**KELLY, COOKE & COMPANY**
Engineers
149 BROADWAY 424 CHESTNUT STREET
NEW YORK PHILADELPHIA

**E. W. CLARK & CO. MANAGEMENT CORPORATION**
*Engineers*
Unit Power Plants insure low power costs
Huntington Bank Bldg., Columbus, Ohio

The Most Successful Men in the Electric Railway Industry read the
ELECTRIC RAILWAY JOURNAL
Every Week

Griffin Wheel
Company
McCormick Building
Chicago, Ill.

GRIFFIN F. C. S. WHEELS

For Street and Interurban Railways

All of our plants have adequate facilities for fitt'ng wheels to axles

FOUNDRIES:

Chicago Detroit Boston St. Paul Tacoma
Denver Kansas City Los Angeles

---

**L. E. GOULD**
Consultant and Specialist
Energy Measurement
For Electric Railways
Investigations · Tests · Recommendations
Old Colony Bldg. Chicago

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**WALTER JACKSON**
*Consultant*
FARES, BUSES, MOTOR TRUCKS
More revenue from *more* riders
143 Crary Ave., Mt. Vernon, N. Y.
Address June and July:
13 Ranulf Road, Hampstead, N. W. 2, London, Eng.

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Byllesby
Engineering & Management
Corporation
208 S. La Salle Street, Chicago
New York Tacoma

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**DAY & ZIMMERMANN, INC.**
ENGINEERS
*Design, Construction*
*Reports, Valuations, Management*
NEW YORK PHILADELPHIA CHICAGO

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**THE P. EDWARD WISH SERVICE**
50 Church St.
NEW YORK
DETECTIVES
*Street Railway Inspection*
131 State St.
BOSTON

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When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

---

**A. L. DRUM & COMPANY**
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

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The Most Successful Men in the Electric Railway Industry read the
ELECTRIC RAILWAY JOURNAL
Every Week

---

JAMES E. ALLISON & CO.
Consulting Engineers
Specializing in Utility Rate Cases and Reports to Bankers and Investors
Security Building, St. Louis, Mo.

# A NEW SEAL

## *signifying the superior quality and service of*

**CONSOLIDATED**

- Electric Car Heaters
- Thermostatic Control
- Buzzer Signal System
- Motorman's Starting Signals
- Single Stroke Bells

**CONSOLIDATED**

- Pneumatic Door Engines
- Multiple Car Door Control
- Resistors
- Fuse Boxes
- Safety Switches

## *Backed By a Performance Record of Many Years in the Electric Railway and in the Steam Railroad Fields*

From the time of its founding, the Consolidated Car Heating Company has borne a high reputation for progressiveness in invention and for quality in production.

Consolidated products have played an important part in keeping down maintenance expense, with a resulting increase in earnings to the railways.

Every Consolidated product has been designed with the definite aim of improving car comfort, car safety and efficiency.

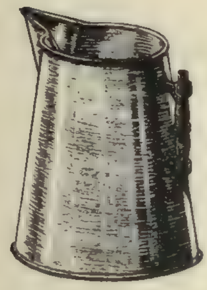
Years of practical experience in solving railway equipment problems has enabled the Consolidated Car Heating Company to put at the disposal of the electric railway executive, mechanical and purchasing officers, dependable products that serve and save.

## CONSOLIDATED CAR-HEATING CO.

Albany, New York

New York City Chicago Coaticook, Quebec

# The Old Tallow Pot



WHEN the old tallow pot stood on the steam chest, engine design, speed and pressure were far different from what they are today.

Changing conditions made new lubricating requirements.

Many kinds of lubricators were invented. The good ones stood the test of time—and their names are known to all engineers today.

But by a strange paradox there are some engineers who have long since abandoned the old slip-shod, unscientific method of feeding cylinder oil, but who still continue to buy cylinder oils by old standards.

It is self evident that the oil which was satisfactory under the conditions of fifteen to twenty years ago may not efficiently meet the new requirements.

It is equally patent that an Oil Company, which has profited by the old and kept abreast of the new, can render great assistance to you in securing and maintaing high efficiency in cylinder lubrication.

We know today that we can meet any or all of the conditions encountered in the lubrication of simple or compound, large or small units.

Our belief in Texaco Cylinder Oils is based on consistent excellent performance records on every type of engine and in every kind of plant in this country and abroad.

---

*Some of the* TEXACO CYLINDER OILS *we recommend:*

**For Superheated Steam**....................**Texaco Leader Cylinder Oil**
**For Saturated Steam**
*Above* 150 *pounds pressure*............**Texaco Leader Cylinder Oil**
**For Saturated Steam**
*Below* 150 *pounds Pressure*...........**Texaco Pinnacle Cylinder Oil**
**For Wet Steam**..........................**Texaco Summit Valve Oil**

*If the oil is fed directly into the valves and the steam pressures are low,*
TEXACO OLYMPIAN CYLINDER OIL *will be very economical*

---

There may be some special conditions which will require individual treatment. If your engines are operating under unusual conditions and you wish to learn the right lubricant to use, let us know the name of the manufacturer, the type, steam conditions, and the general operating conditions and we shall give you the right Texaco Lubricant to give you the best possible service.

*There is a Texaco Lubricant for Every Purpose*

## THE TEXAS COMPANY

DEPT·R-J·17 BATTERY PLACE·NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES

# The ←3"→ Contact

## There's Safety and Economy in Its Unshakeable Grip

You don't need to be told the costly results of mishaps, from trolley wheels leaving the wire, tearing down overhead, damaging car roofs, delaying service and even injuring passengers.

# The Miller Trolley Shoe

hugs the wire at a 60 mile clip—the 3-inch contact has no sensitive axis to bend or loosen. The Miller Trolley Shoe ends for all time the "chore" of constant lubrication.

Your motorman gets more power because of the greater contact surface. Your conductor is relieved from the constant necessities of replacing a "jumped-off" pole.

***It's to your advantage to hear the rest of the story. Write us.***

## Miller Trolley Shoe Co., West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

EASTERN REPRESENTATIVE: National Railway Appliance Co., New York

SALES REPRESENTATIVES:

Alfred Connor, Denver, Colo.
T. C. White & Co., St. Louis, Mo.
F. F. Bodler, San Francisco, Calif.
W. M. McClintock, St. Paul, Minn.
S. I. Wailes, Los Angeles, Calif.
W. F. McKenney, Portland, Oregon

# "STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

*"The 'Standard' Brand on your material is an assurance of eventual economy."*

## STANDARD STEEL WORKS CO.

GENERAL OFFICES

500 NORTH BROAD ST., PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
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SAN FRANCISCO
NEW YORK
HOUSTON

MONTEREY, MEX.
MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

# ENGLAND SAYS

T. S. Q. means this ↓

*(Extract from a letter from one of our 74 customers in England)*

With reference to the copy of the letter from the General Manager of a Colonial Tramway System, giving his experience of the life of the Tool Steel Gears and Pinions, I think our experience has been quite equal and perhaps even a little better. We are perfectly satisfied with our results of the use of this gear.

"Tool Steel" Quality T. S. Q. "Tool Steel" Quality

**The Tool Steel Gear & Pinion Co.**

Cincinnati, Ohio

An installation of Helical Gear Hobbing Machines in the Nuttall plant.

# Gear Vibration Costs Money

Vibration is a very destructive agent. It quickly destroys operating equipment, thus causing heavy maintenance expense.

Helical Gears, if properly designed and constructed, prevent vibration and noise.

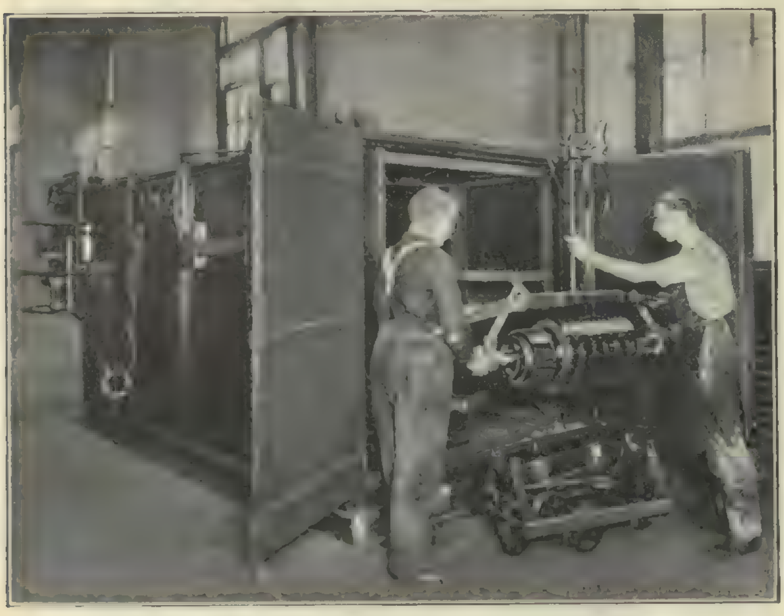
The Nuttall Company has the distinction of having designed and made successful railway helical gears. This company's facilities for turning out A No. 1 helical gears are ample to meet any demand.

Above is shown a part of a large installation of special Nuttall Helical Gear Hobbers. More than 25,000 railway helical gears have been cut with these hobbers.

*Write for Bulletin No. 28.*

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

**Nuttall**



*Irv-O-Slot for Core Insulation—Irvington black varnished cambric for coils—and Irvington Varnish for dipping adds years to the life of your armature after it is properly treated and baked.*

**—makes armatures good for years to come—**

**IRVINGTON INSULATION**

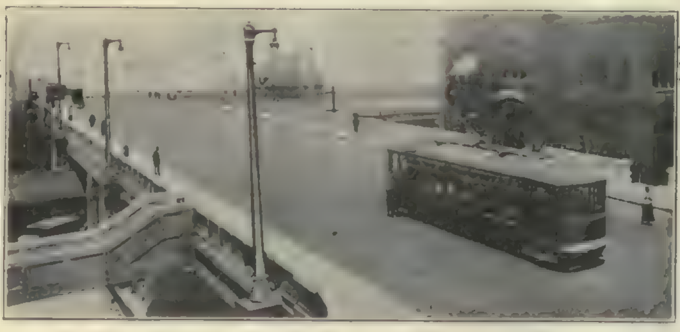
The reason why armatures insulated with Irvington products last longer and give better service is because of the quality of materials used.

Irvington products are famed for high resistance, high dielectric strength, non-hygroscopic qualities, heat resistance and neutrality to chemical action. Insist upon these qualities.

**IRVINGTON VARNISH & INSULATOR CO**

*Distributors:*
MITCHELL-RAND MFG. CO., New York City L. L. FLEIG & CO., Chicago
ELECTRIC RAILWAY & MANUFACTURERS SUPPLY CO., San Francisco
T. C. WHITE ELECTRICAL SUPPLY CO., St. Louis
CONSUMERS RUBBER CO., Cleveland

**Irvington, New Jersey**



**Massey Poles Do Double Duty—**

The adaptability of Massey Poles to the two-fold purpose of trolley support and lighting standard is illustrated above.

Made by a special centrifugal process that insures their lightness and strength, Massey Hollow Reinforced Concrete Poles require no maintenance and provide a support which is pleasing in appearance as well.

***Data on this installation and others is available and will gladly be sent upon request.***

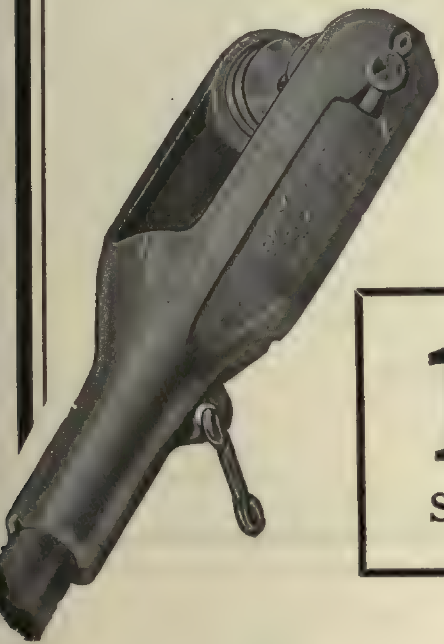
**Massey Concrete Products Corporation**
**Peoples Gas Bldg., Chicago**

New York
50 Church St.
Dallas
Sumpter Bldg.

Pittsburgh
Oliver Bldg.
St. Louis
Ry. Exch. Bldg.

Atlanta
Candler Bldg.
Salt Lake City
925 S. 6th St., W.

Consider the
Value of the
TIME SAVED
by
BAYONET
Trolley Equipment



10
Seconds

are all the time required to change a Bayonet Trolley Harp or Wheel, or substitute a Bayonet Sleet Cutter.

The Bayonet Trolley Base with Detachable Pole Clamp is the only trolley base made on which the trolley pole can be changed in 30 SECONDS and the wheel be in perfect alignment with the wire, no tools required to do the job. And remember that neither safety nor durability are in any way sacrificed for speed.

You know how valuable those seconds are when headway and schedules are to be maintained.

*Bayonet Equipment is sold subject to approval. It's the surest step you can take toward economy-plus-efficiency.*

Bayonet Trolley Harp Co.
Springfield, Ohio

Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

Our New 1921 TREATISE AND HANDBOOK sent upon request.

Bates Expanded Steel Truss Co.
208 South La Salle Street
CHICAGO, ILLINOIS

# Constant Brush Pressure

**assures**

## Sparkless Commutation

# Lindall Brush Holders

guarantee constant brush pressure. Why bother with pigtails and screws that work loose, when you can blot out all brush worries at one stroke—by standardizing on Lindall brush holders?

Brushes easily removed or inserted.

*Ask us for Catalog 8 and revised prices.*

TRADE MARK
Reg. U. S. Pat. Off.

## Albert & J. M. Anderson Mfg. Co.

***Established 1877***

**289-293 A St., Boston, Mass.**

Branches—New York, 135 B'way. Philadelphia, 429 Real Estate Trust Bldg. Chicago, 105 So. Dearborn St. London, 171 Tottenham Court Road.

TRADE MARK
AETNA
REGISTERED

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## Order By Name

See that "White" is on the end of every porcelain insulator you buy.

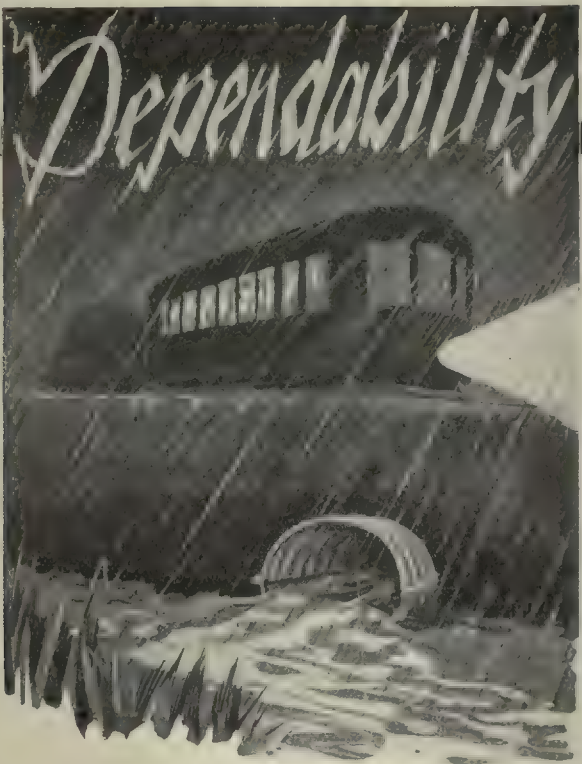
"White" reputation has encouraged substitution. You can't risk having a brittle, porous, unreliable insulator that has no mechanical or dielectric strength, worked off on you.

"White" quality goes with the name on the end.

Safeguard line interests by refusing any other "just as good" insulator.

## T. C. WHITE ELECTRICAL SUPPLY CO.

1122 PINE STREET, ST. LOUIS, MO.



When lightning rips the sky, rain descends in heavy torrents and the floods come—then of all times you feel the need of dependable culverts, such as

**"ACME" (NESTABLE)**
**TONCAN**
**CORRUGATED METAL CULVERTS**

Made of heavy gauge Toncan Metal, "ACMES" possess both strength and long life. (Toncan Metal is anti-corrosive). As evidence of "ACME" dependability we call attention to those installed in 1908. They have experienced the hardest summer storms and floods, not to mention the most severe winters. Yet they have given perfect service, every year, during the entire 13 years. That's not all. Because they show no signs of rust they are good for many more years of service. We leave it to you—isn't that real dependability!

*Write for delivered prices*

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.

Use The Modern Method To Anchor Cables

A Westinghouse-Frankel Solderless Anchor between the cable and the strain insulator offers decided advantages:

It will reduce labor charges during installation.

It is easily and quickly removed for changes.

It will stand strains that would pull soldered connections apart.

These anchors are particularly applicable on overhead busses in factories. They can be supplied in three forms.

Style 2587 for anchoring single cables.

Style 2588 for anchoring single cables having a branch near the end.

Style 2589 for anchoring two cables that are at right angles to each other.

**Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.**
Sole Agent in the United States

International Registers

TO handle fares in an accurate, dependable system of collection and registration some method of checking load against receipts is necessary.

International Registers with their visible and audible registration at the time fare is received provide an adequate system for continuous service, immediately meeting any change in collection methods or equipment.

Registers for many conditions and classes of service are made by the International Register Company. All these are quality machines, properly designed and built for accurate registration and long enduring service with minimum repairs or replacements. The effectiveness and adaptability of International Registers has been proven by thirty years' service on leading electric railway and city systems throughout the country.

*Exclusive selling agents for*
HEEREN ENAMEL BADGES

**The International Register Co.**
**15 South Throop Street, Chicago, Illinois**

Eureka

Just two of a group of specialties that have set a standard for Quality.

***Controller Fingers*** are made of hard drawn or drop forged copper while the springs are stamped from special alloyed rolled phosphor bronze sheet. Fingers are interchangeable with all standard controllers.

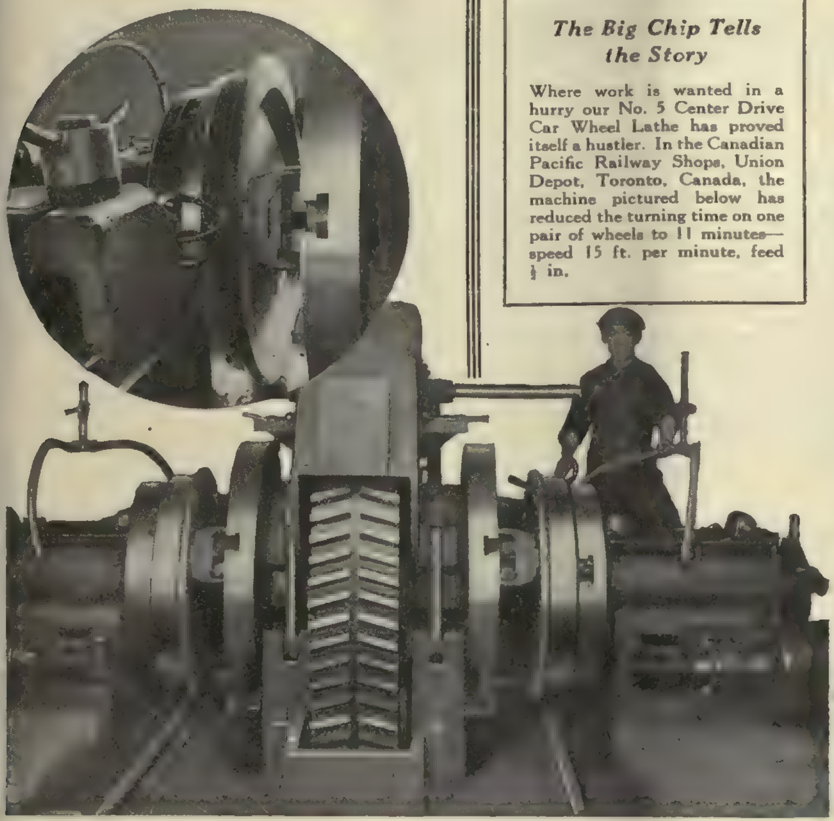
*Made by*
**The EUREKA CO.**
**North East, Penn.**
**120 Broadway, New York**

***Trolley Wheels*** are perfectly balanced, made of virgin metal and well finished. Correct design insures less wear on trolley wire and longer life of wheel.

## Turning a Pair of Car Wheels in 11 Minutes

*The Big Chip Tells the Story*

Where work is wanted in a hurry our No. 5 Center Drive Car Wheel Lathe has proved itself a hustler. In the Canadian Pacific Railway Shops, Union Depot, Toronto, Canada, the machine pictured below has reduced the turning time on one pair of wheels to 11 minutes—speed 15 ft. per minute, feed ⅜ in.



THE high production of which this machine is capable is largely due to the center driving construction with powerful herringbone gear having automatic quick-acting hinged segment to admit the axles.

Additional time and labor saving features include semi-automatic drivers, pneumatic tool clamps, pneumatically operated tailstocks, push button motor control.

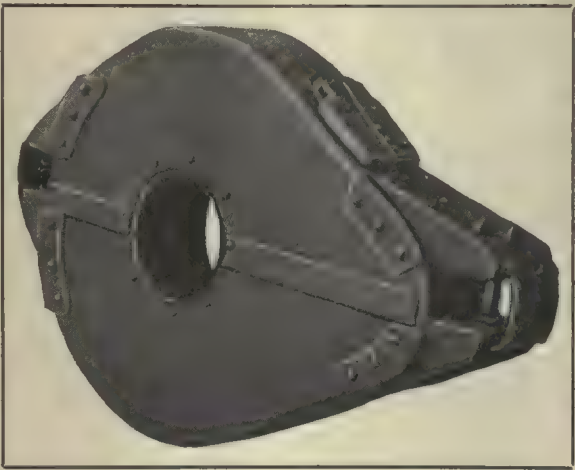
### N-B-P Center Drive Car Wheel Lathe

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including car wheel lathes, wheel presses, axle lathes, car wheel borers, etc., as well as steam forge hammers, engine lathes, boring and turning mills, etc., and the electric travelling cranes to serve them.

**NILES-BEMENT-POND CO.**
111 BROADWAY NEW YORK

# Chillingworth One Piece Gear Case

Made from special deep drawn Open Hearth Steel



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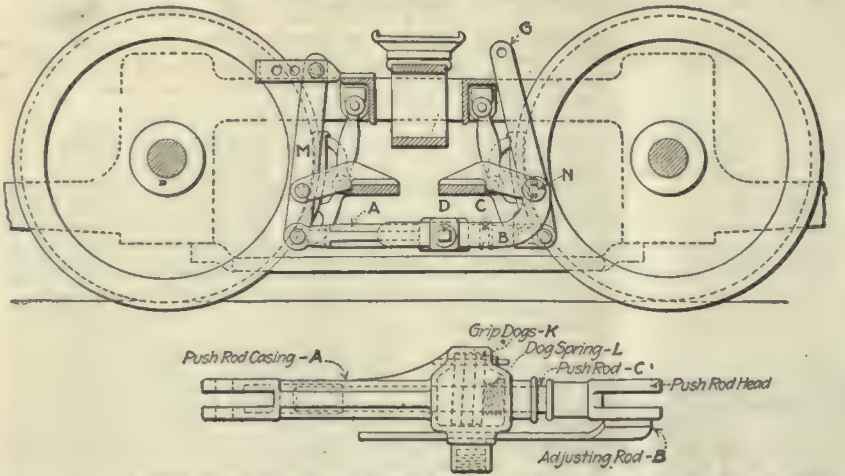

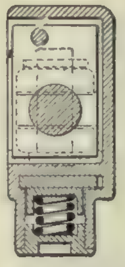

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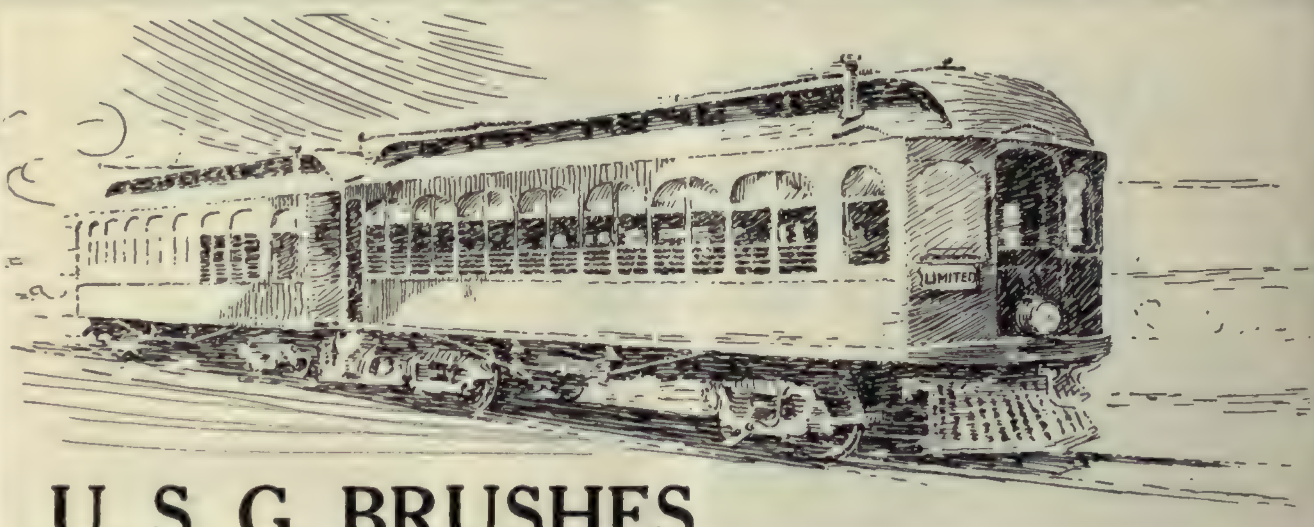

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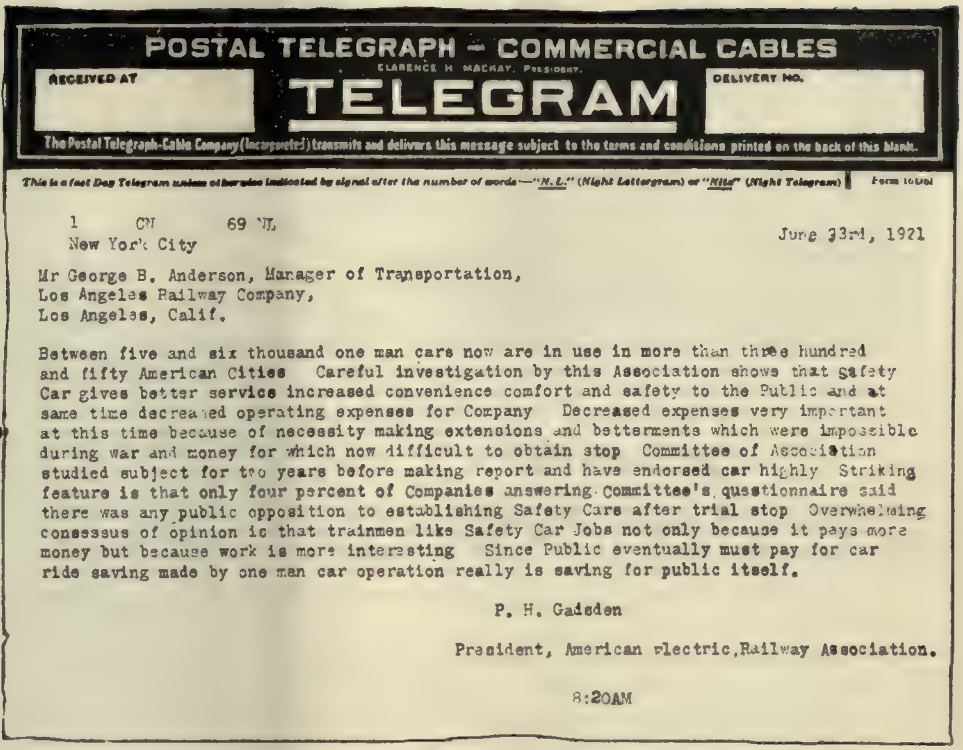

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New York City
June 23rd, 1921

Mr George B. Anderson, Manager of Transportation,
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P. H. Gadsden

President, American Electric,Railway Association.

8:20AM

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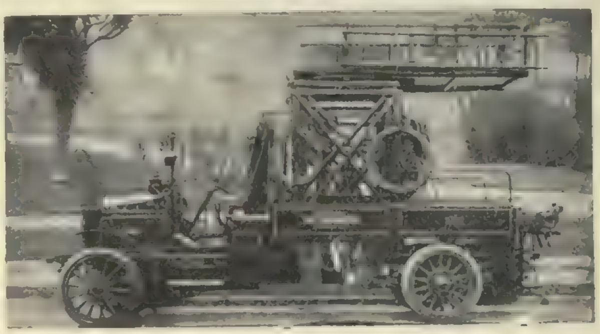

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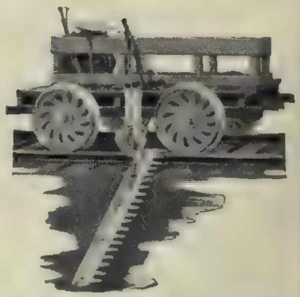

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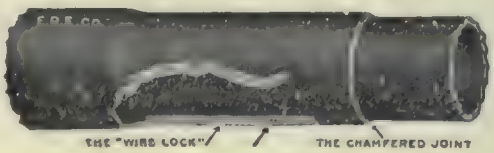

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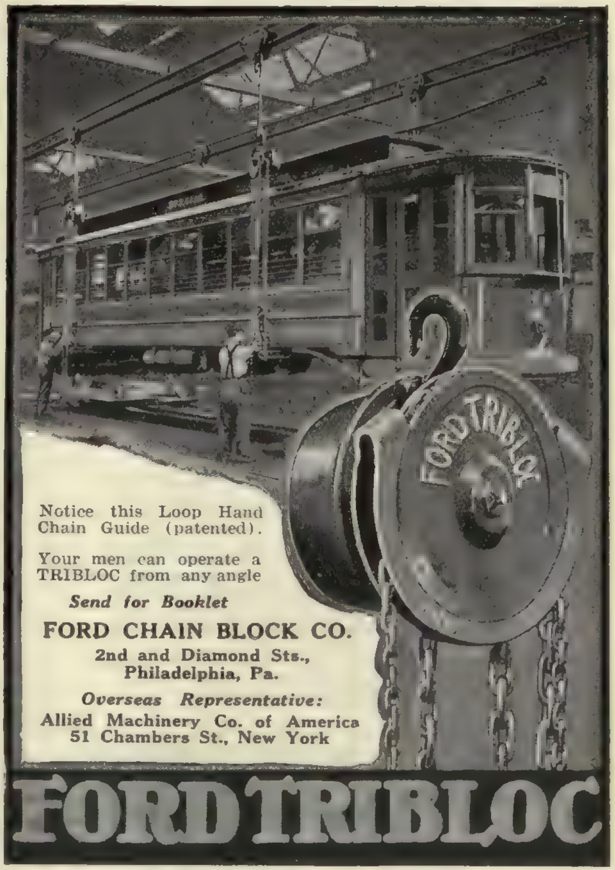

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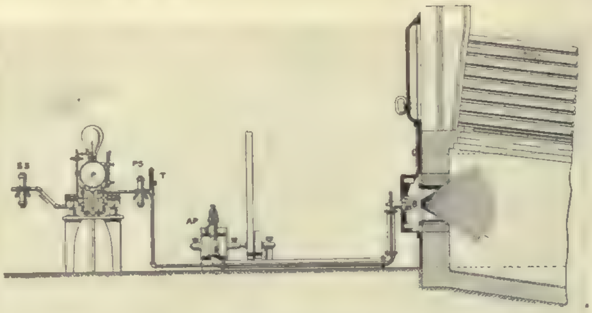

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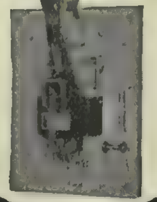

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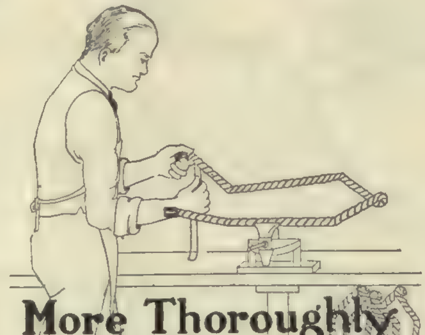

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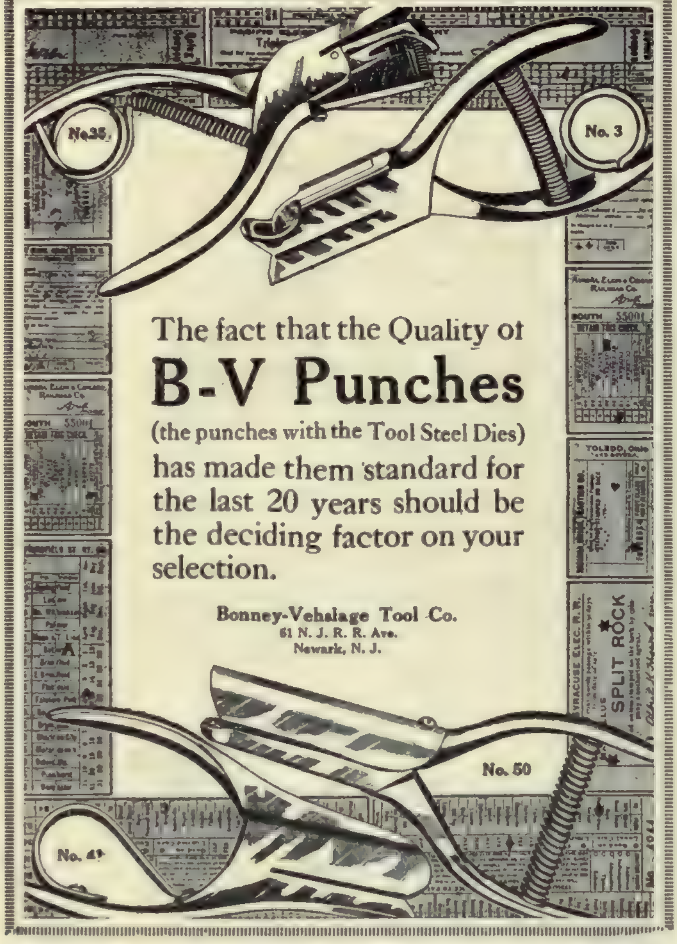

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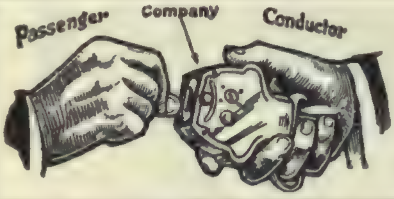

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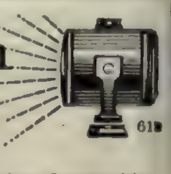

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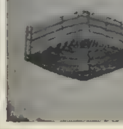
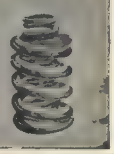
RAILWAY SERVICE





ELECTRIC RAILWAY JOURNAL

# Think "SEARCHLIGHT" First

## ADVERTISING RATES

**POSITIONS VACANT**—Business Opportunities and other undisplayed ads. 8 cents a word, minimum $2.00 an insertion.

**POSITIONS WANTED**—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment. 4 cents a word, minimum 75 cents, payable in advance.

**ADD 5 WORDS** for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

**DISCOUNT OF 10%** if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

**ADS IN DISPLAY TYPE**—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

**RATE PER INCH** for ads in display space:
1 to 3 in., $4.50 an in. 15 to 29 in., $3.90 an in.
4 to 7 in., $4.30 an in. 30 to 49 in., $3.80 an in.
8 to 14 in., $4.10 an in. 50 to 99 in., $3.70 an in.

POSITIONS VACANT **EMPLOYMENT** POSITIONS WANTED

### POSITIONS WANTED

CAPABLE master mechanic of proven executive ability, now employed, seeks opportunity to make change, where initiative and dependability are required; 20 years' experience in electric railway field, thoroughly competent in the construction, rebuilding, maintenance and operation of city and interurban cars. PW-918, Elec. Ry. Journal, Old Colony Bldg., Chicago.

MAN, age 45, seven years' experience handling material accounts, stores records, shop payrolls, distribution sheets, wishes a position; would leave New York. PW-920, Elec. Ry. Journal.

PRACTICAL trackman of nearly 30 years' experience desires change and position as superintendent of tracks or roadmaster. Can handle any track proposition; seven years in one of largest cities in United States; very best references. PW-917, Elec. Ry. Journal.

TRACK superintendent requires position with electric railroad in any part of the world. Young, energetic, ambitious; progressive. Had experience in trop'cs. Can speak Hindustandi. PW-921, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

TRAFFIC manager or assistant superintendent by young man with 11 years' experience as trainman, inspector, schedule and chief clerk; successful in dealing with employees. PW-903, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

VALUATION engineer, experienced in valuation of electric railways, electric light and power properties. Also experienced in management, construction and maintenance of electric railway properties. PW-896, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

**For 20 Years**
we have been
Buying and Selling
**Second-Hand Cars**
Trucks and Motors
At Your Service

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

1—22x42 480 H.P. Bates Corliss Engine direct connected to 325 K.W., 550 Volt D.C., 100 R.P.M. Westinghouse Generator with Switchboard panel.

*Location Mattoon, Ill.*

**CENTRAL ILLINOIS PUBLIC SERVICE COMPANY**
*D. R. Truax Purchasing & Stores Agent*
Springfield, Illinois.

SEARCHLIGHT
SERVICE
SECURES
SATISFACTORY
SALES
2004

**IN STOCK**
***for Immediate Shipment***

**Turbo Units, Rotary Converters, Transformers, Motor Generator Sets, Dynamos and Motors**

**ARCHER & BALDWIN, Inc.**
114-118 Liberty St., New York City
Telephone 4337-8 Rector

You can get
**A Production Checker**
at little cost

Here is an opportunity to get a *Productograph* to keep count and make curve chart record on one to twenty producing machines. From these records you know exactly the production you are actually getting from your machines. No guessing. It is in first class condition and various spare parts are included.

**Bargain price for quick sale.**

W. A. Hefner, care of McGraw-Hill Co., 10th Ave. at 36th St., New York City

**SEARCHLIGHT SERVICE**

**Covers the advertising of**

Agencies Wanted
Agents Wanted
Auction Notices
Bids Wanted
Books and Periodicals
Buildings for Sale
Business Opportunities
Civil Service Opportunities
Contracts to Be Let
Contracts Wanted
Desk Room for Rent
Desk Room Wanted
Educational
Employment Agencies
Evening Work Wanted
Foreign Business
For Exchange
For Rent
Franchises
Industrial Sites
Labor Bureaus
Machine Shops
Machinery Wanted
New Industries Wanted
Partners Wanted
Patent Attorneys
Patents for Sale
Plants for Sale
Positions Vacant
Positions Wanted
Property for Sale
Proposals
Receivers' Sales
Representatives Wanted
Salesmen Want Connections
Salesmen Wanted
Second Hand Equipment
  For Sale For Rent
  Exchange Wanted
Specialties
Tutoring
Vacation Work Wanted
Water Front Property
Work Wanted
Miscellaneous for Sale
  for Rent or Want Ads.

**Can we serve you?**
0150

# Power Plant Equipment

## DIRECT CONNECTED UNITS

1—1800 hp. Cooper cross-compound engine, size 28 x 60 x 60, speed 80 r.p.m., flywheel 18 ft. 60 ton, direct connected to 1200 kw. G. E. 575 volt generator, 16 pole.

1—1800 hp. Cooper cross-compound engine, size 28 x 60 x 60, speed 80 r.p.m. fly wheel 18 ft. 60 ton, direct connected to 1200 kw. G. E. generator, 16 pole, 575 volt.

2—300 hp. Slater cross-compound engines, size 14 x 28 x 36, speed 120 r.p.m., direct connected to two 250-kw. 550 volt Westinghouse 8 pole direct current generators.

2—300 hp. McIntosh & Seymour tandem-compound engines, size 13 x 23 x 22, speed 200 r.p m., fly wheel 4 ton, 9 ft. diameter, direct connected to two 220 k.w. Walker generators, 550 volt. 8 pole.

1—500 hp. Hamilton-Corliss Simple engine, size 28 x 36, speed 120 r.p.m. 18 ton, 14 ft. 6 in. fly wheel, direct connected to 400 kw. G.E. 550 volt, 8 pole, direct current generator.

2—1500 hp. Pennsylvania Iron Works, cross-compound engines, size 30 x 48 x 48, speed 80 r.p.m., fly wheel 22 ft., 50 ton, direct connected to 850 kw. G. E. 575 volt, 12 pole, direct current generator.

1—750 hp. Greene cross-compound engine, size 20 x 38 x 48, speed 100 r.p.m., direct connected to 525 kw. G. E. 550 volt, 8 pole direct current generator.

1—700 hp. Pennsylvania Iron Works cross-compound engine, size 22 x 40 x 42, speed 90 r.p.m., direct connected to 500 kw. G. E. 550 volt, 10 pole direct current generator.

1—400 hp. Hamilton-Corliss cross-compound engine, size 16 x 30 x 42, speed 100 r.p.m., direct connected to 325 kw. Westinghouse 600 volt, 8 pole, direct current generator.

## BOILERS

3—231 hp. B. & W. water tube boilers, 108-4 in. x 18 ft. tubes.

1—250 hp. B. & W. water tube boilers, 126-4 in. x 18 ft. tubes.

1—250 hp. Cahall boiler, 126-4 in. x 18 ft. tubes.

4—250 hp. National water tube boilers, 150-4 in. x 16 ft. tubes.

1—350 hp. Cahall water tube boiler, 168-4 in. x 18 ft. tubes.

1—400 hp. B. & W. water tube boiler, 196-4 in. x 18 ft. tubes, B. & W. 75 deg. superheater.

1—600 hp. B. & W. water tube boiler, 294-4 in. x 18 ft. tubes, B. & W. 75 deg. superheater.

1—500 hp. Edgemoor boiler, 248-4 in. x 18 ft. tubes, Foster 75 deg. superheater.

3—115 hp. Kendall horizontal return tubular boiler, 114-3 in x 18 ft. tubes.

2—150 hp. Kendall horizontal return tubular boilers, 110-3 in. x 16 ft. tubes.

2—150 hp. New England Iron Works Co. horizontal return tubular boilers, 132-3 in. x 16 ft. tubes.

1—600 hp. B. & W. water tube boiler, 294-4 in. x 18 ft. tubes.

1—250 hp. B. & W. water tube boiler, 126-4 in. x 18 ft. tubes.

2—185 hp. B. & W. water tube boilers, 108-4 in. x 16 ft. tubes.

2—500 hp. B. & W. water tube boilers, 252-4 in. x 18 ft. tubes, 80 deg. B. & W. superheater.

1—500 hp. B. & W. water tube boiler, 252-4 in. x 18 ft. tubes, 50 deg. B. & W. superheater.

3—250 hp. B. & W. water tube boilers, 126-4 in. x 18 ft. tubes.

1—125 hp. Hewey horizontal return tubular boiler.

## ENGINES

2—500 hp. Greene tandem-compound engines for belt drive, size 17 x 33 x 48, speed 104, fly wheels 49 in. face by 16 ft. diameter.

3—500 hp. Hamilton-Corliss tandem-compound engines, size 18 x 34 x 48, speed 72 r.p.m., fly wheels 38 in. face, 22 ft. diameter.

One 700 hp. Cooper cross-compound engine, size 20 x 36 x 48, speed 75 r.p.m., flywheel 49 in. face, 20-ft. diameter.

1—300 hp. Harris Simple engine, size 22 x 48, speed 79 r.p.m., belt wheel 32 in. face, 17 ft. diameter.

1—125 hp. McIntosh & Seymour high speed horizontal engine.

## GENERATORS

2—500 kw. G. E. 550 volt, 350 r.p.m., 4 pole, direct current generators.

3—300 kw. G. E. 550 volt, 400 r.p.m., 4 pole, direct current generator.

1—250 kw. Seamens-Halski, 550 volt, 440 r.p.m., 6 pole, direct current generator.

1—Booster Set, 59 hp., 900 r.p.m., 550 volt, motor, direct connected to 55 kw., 4 pole generator, 200 volt boost.

1—250 kw. Westinghouse 500 volt, 420 r.p.m., 4 pole, direct current generator.

2—45 kw. 110 volt, G. E. direct current generators.

## MISCELLANEOUS EQUIPMENT

Various boiler feed pumps, condensers, piping, coal scales and auxiliary equipment used in connection with the above units.

*Supplanted by Purchased Power*

**EASTERN MASSACHUSETTS ST. RY. CO.**
**1 BEACON ST., BOSTON, MASS.**

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*The advertisements in the*
## SEARCHLIGHT SECTION
*of this paper*

constitute the most comprehensive group of "live" opportunities to be found in any publication serving this industry.

Each announcement represents a current Want of a concern or individual in the industry with some element of profit in each for whoever can fulfill the need. Some have money saving possibilities, others are opportunities for more business; many are employment opportunities while still others offer chances to buy going businesses, plants, property, etc.

"Searchlight" advertisements are constantly changing. New opportunities find their way into this great Want medium each issue. Regular consultation of the "Searchlight" pages should be as important to the careful reader as reading editorial articles of his particular liking. One is news of the industry, the other, the NEWS OF OPPORTUNITIES being offered in the industry. No one can afford to overlook opportunities.

*For Every Business Want*

***"Think** SEARCHLIGHT **First"***

0140

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
- Collier, Inc., Barron G.

**Air Receivers**
- Western Elec. Co.

**Anchors, Guy**
- Electric Service Supplies Co.
- Ohio Brass Co.
- Western Elec. Co.
- Westinghouse Elec. & Mfg. Co.

**Automobiles and Buses**
- Brill Co., The J. G.

**Axles**
- Bemis Car Truck Co.
- Midvale Steel & Ordnance Co.
- St. Louis Car Co.

**Axle Straighteners**
- Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Standard Steel Works Co.
- Westinghouse Elec. & Mfg. Co.

**Babbitt Metal**
- More-Jones Brass & Metal Co.

**Babbitting Devices**
- Columbia M. W. & M. I. Co.
- Western Elec. Co.

**Badges and Buttons**
- American Railway Supply Co.
- Electric Service Supplies Co.
- International Register Co., The
- Western Elec. Co.

**Batteries, Dry**
- National Carbon Co. Inc.
- Western Elec. Co.

**Batteries, Storage**
- Electric Storage Battery Co.

**Bearings and Bearing Metals**
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- Eureka Co.
- General Electric Co.
- More-Jones Brass & Metal Co.
- Post & Co., Inc., E. L.
- St. Louis Car Co.
- Westinghouse Elec. & Mfg. Co.

**Bearings, Center and Roller Side**
- Stucki Co., A.

**Bells and Gongs**
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- St. Louis Car Co.
- Western Elec. Co.

**Benders, Rail**
- Niles-Bement-Pond Co.

**Boilers**
- Babcock & Wilcox Co.

**Boiler Tubes**
- National Tube Co.

**Bond Testers**
- American Steel & Wire Co.

**Bonding Apparatus**
- American Steel & Wire Co.
- Electric Railway Improvement Co.
- Electric Service Supplies Co.
- Ohio Brass Co.

**Bonds, Rail**
- American Steel & Wire Co.
- Copper Clad Steel Co.
- Electric Railway Improvement Co.
- Electric Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- Westinghouse Elec. & Mfg. Co.

**Boring Tools, Car Wheel**
- Niles-Bement-Pond Co.

**Bores—Junction and Outlet**
- National Metal Molding Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
- Bates Expanded Steel Truss Co.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- Hubbard & Co.
- Ohio Brass Co.
- Western Elec. Co.

**Brake Adjusters**
- Gould Coupler Co.
- National Ry. Appliance Co.
- Smith-Ward Brake Co.
- Westinghouse Traction Brake Co.

**Brake Shoes**
- Amer. Brake Shoe & Fdry. Co.
- Barbour-Stockwell Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
- Allis-Chalmers Mfg. Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- National Brake Co.
- St. Louis Car Co.
- Westinghouse Traction Brake Co.
- Western Elec. Co.

**Brooms, Track, Steel or Rattan**
- American Rattan & Reed Mfg. Co.
- Western Elec. Co.

**Brushes, Carbon**
- General Electric Co.
- Jeandron, W. J.
- National Carbon Co. Inc.
- United States Graphite Co.
- Westinghouse Elec. & Mfg. Co.

**Brushes, Graphite**
- National Carbon Co., Inc.
- United States Graphite Co.

**Brush Holders**
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.
- Eureka Co.

**Bushings, Case Hardened and Manganese**
- Bemis Car Truck Co.
- Brill Co., J. G.
- National Metal Molding Co.

**Bushings, Graphite and Wooden**
- Bound Brook Oilless Bearing Co.

**Cables. (See Wires and Cables)**

**Cambric, Yellow & Black Varnished**
- American Di-Electric, Ltd.
- Irvington Varnish & Insulator Co.

**Cambric Tapes, Yellow & Black Varnished**
- American Di-Electric, Ltd.
- Irvington Varnish & Insulator Co.

**Carbon Brushes. (See Brushes, Carbon)**

**Car Panel Safety Switches**
- Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
- Differential Car Co.

**Cars, Passenger, Freight, Express, etc.**
- American Car Co.
- Brill Co., The J. G.
- Kuhlman Car Co., G. C.
- McGuire-Cummings Mfg. Co.
- Midvale Steel & Ordnance Co.
- National Ry. Appliance Co.
- St. Louis Car Co.
- Wason Mfg. Co.

**Cars, Second Hand**
- Electric Equipment Co.

**Cars, Self-Propelled**
- Electric Storage Battery Co.
- General Electric Co.

**Castings, Brass, Composition or Copper**
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.
- Eureka Co.
- More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
- American Steel Foundries
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- Standard Steel Works Co.

**Castings, Malleable and Brass**
- Amer. Brake Shoe & Fdry. Co.
- Bemis Car Truck Co.
- Columbia M. W. & M. I. Co.
- St. Louis Car Co.

**Catchers and Retrievers, Trolley**
- Earll, Chas. I.
- Electric Service Supplies Co.
- Ohio Brass Co.
- Trolley Supply Co.
- Wood Co., Chas. N.

**Checks, Employees**
- American Railway Supply Co.

**Circuit Breakers**
- Automatic Reclosing Circuit Breaker Co.
- Cutter Elec. Mfg. Co.
- Don-O-Lac Co.
- General Electric Co.
- Western Elec. Co.
- Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
- Anderson Mfg. Co., A. & J. M.
- Dossert & Co.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- Eureka Co.
- General Electric Co.
- Hubbard & Co.
- Ohio Brass Co.
- Western Elec. Co.
- Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)**
- Brill Co., The J. G.

**Cleats**
- National Metal Molding Co.
- Western Elec. Co.

**Clusters and Sockets**
- General Electric Co.

**Coal and Ash Handling. (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

**Coils, Armature and Field**
- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Independent Lamp & Wire Co.
- Westinghouse Elec. & Mfg. Co.

**Coils, Choke and Kicking**
- Electric Service Supplies Co.
- General Electric Co.
- Western Elec. Co.
- Westinghouse Elec. & Mfg. Co.

**Coin-Counting Machines**
- Electric Service Supplies Co.
- International Register Co., The
- Johnson Fare Box Co.

**Commutator Slotters**
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
- General Electric Co.

**Commutators or Parts**
- Cameron Electrical Mfg. Co.
- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- Don-O-Lac Co.
- Eureka Co.
- General Electric Co.
- Mica Insulator Co.
- Western Elec. Co.
- Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
- Chicago Pneumatic Tool Co.
- General Electric Co.
- Westinghouse Trac. Brake Co.

**Concrete Products**
- Massey Concrete Products Co.

**Condensers**
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Schutte & Koerting Co.
- Westinghouse Elec. & Mfg. Co.

**Condensor Papers**
- Irvington Varnish & Insulator Co.

**Conduits, Flexible**
- Tubular Woven Fabric Co.

**Conduits, Interior**
- National Metal Molding Co.
- Western Elec. Co.

**Connectors, Solderless**
- Dossert & Co.
- Frankel Connector Co.
- Westinghouse Elec. & Mfg. Co.

**Controller Fingers**
- Russell Mfg. Co.

**Controllers or Parts**
- Columbia M. W. & M. I. Co.
- Don-O-Lac Co.
- Eureka Co.
- General Electric Co.
- Russell Mfg. Co.
- Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
- Elec. Service Supplies Co.

**Controlling Systems**
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Western Elec. Co.
- Westinghouse Elec. & Mfg. Co.

**Conveying and Hoisting Machinery**
- Columbia M. W. & M. I. Co.

**Cooling Systems**
- Spray Engineering Co.

**Copper Wire**
- Anaconda Copper Mining Co.
- Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
- Brill Co., The J. G.
- Electric Service Supplies Co.
- International Register Co., The
- Roebling's Sons Co., John A.
- Samson Cordage Works
- Silver Lake Co.
- Trolley Supply Co.

**Cord Connectors and Couplers**
- Electric Service Supplies Co.
- Samson Cordage Works
- Wood Co., Chas. N.

**Couplers, Car**
- American Steel Foundries
- Brill Co., The J. G.
- Gould Coupler Co.
- Ohio Brass Co.
- Westinghouse Trac. Brake Co.

**Cranes**
- Allis-Chalmers Mfg. Co.
- Niles-Bement-Pond Co.

**Cross Arms. (See Brackets)**

**Crossing Foundations**
- International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Frog & Switch**
- Wharton, Jr., & Co., Wm.

**Crossings, Manganese**
- Indianapolis Switch & Frog Co.

**Crossings, Track. (See Track, Special Work)**

**Culvert Pipe, Concrete**
- Massey Concrete Products Co.

**Culverts**
- Armco Iron Culvert & Flume Mfgrs Ass'n
- Canton Culvert & Silo Co.

**Curtain Materials—(Vestibule) Du Pont Fabrikoid**
- Du Pont de Nemours & Co., Inc., E. I.

**Curtain Materials (Window) Du Pont Fabrikoid**
- Du Pont de Nemours & Co., Inc. E. I.

**Curtains and Curtain Fixtures**
- Brill Co., The J. G.
- Electric Service Supplies Co.
- St. Louis Car Co.

**Dealer's Machinery**
- Archer & Baldwin
- Cleveland Armature Works
- Electric Equipment Co.
- Foster Co., H. M.
- Hyman Michaels Co.

**Derailing Devices. (See also Track Work)**
- Cleveland Frog & Crossing Co.
- Wharton, Jr. & Co., Wm.

**Destination Signs**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

**Detective Service**
- Wish Service, P. Edward

**Dogs, Lathe**
- Williams & Co., J. H.

**Door Operating Devices**
- Consolidated Car Heating Co.
- National Pneumatic Co., Inc.

**Reduce Commutator Wear and Losses Due to "Tie-Ups"**

To be absolutely safeguarded against excessive commutator wear—assured of real mileage day in and day out—and to obtain lower operating costs, use

**Columbia Pyramid Brushes**

the brushes that were made to suit the commutator and the service.

***You name the job—we'll name the brush***

**National Carbon Company, Inc.**
Cleveland, Ohio

**Keep the shopmen on productive work—**

instead of constantly inspecting and adjusting brake-rigging. Install on all cars, dependable, labor-saving and safety-promoting

**SMITH-WARD**

**Brake Slack Adjusters**

You also save in other ways when cars are equipped. Brake-shoe mileage is increased, waste of power through dragging brake-shoes is eliminated, while the constant and automatic correction of slack is one of the surest preventions of accidents.

Smith-Ward Slack Adjusters can be applied to any brake-rigging on any car.

***Send for detailed information.***

**Smith-Ward Brake Co., Inc.**
233 Thirty-seventh St., Brooklyn, N. Y.

**Exide**
**BATTERIES**

Power House
Emergency
Lighting

The EXIDE Battery furnishes light for restoring service during an interruption of the power supply.

*Write for information on this subject.*

THE ELECTRIC STORAGE BATTERY CO.
*Oldest and largest manufacturers in the world of storage batteries for every purpose.*
1888 PHILADELPHIA 1921
*Branches in 17 Cities*
EXIDE BATTERIES OF CANADA, LIMITED
133-157 Dufferin St., Toronto

"Zero" AND "Motor"

for Axle and Journal Bearings

for Armature Bearings

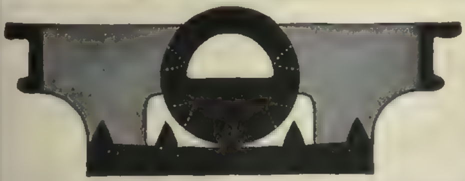
STANDARD for a THIRD of a CENTURY

The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

*Write us for details.*

E. L. Post & Co., Inc., Sole Mfrs., 50 Cliff St, New York City



**STUCKI SIDE BEARINGS**

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

**RAMAPO**

Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way. **Manganese Construction a Specialty.**

**Ramapo Iron Works**
HILLBURN, NEW YORK
Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

**Car Seating, Broom and Snow Sweeper Rattan, Mouldings, etc.**

AMERICAN RATTAN & REED MFG. CO.
Brooklyn, N. Y.

AMERICAN MEANS QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

HACKSAW
HIGH SPEED
GLADIUM
ECONOMY
EFFICIENCY
BLADES
GLADIUM CO. Inc. 34 Cliff St. New York

# WHAT AND WHERE TO BUY

**Doors and Door Fixtures**
Brill Co., The J. G.
Dahlstrom Metallic Door Co.
General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Inc.
Walter A.

**Electric Specialties**
National Electric Specialty Co.

**Electrical Wires and Cables**
American Electrical Works
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. S.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Byllesby & Co., H. M.
Clark Management Corp., E. W.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter.
Jacobs & Co. J. L.
Kelly Cooke & Co.
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J.G.

**Engines, Gas, Oil or Steam**
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Westinghouse Elec. & Mfg. Co.

**Fare Boxes**
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Economy Electric Devices Co.
Johnson Fare Box Co.
Ohmer Fare Register Co.
National Railway Appliance Co.

**Feed Water Heaters**
Schutte & Koerting Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.
Western Elec. Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works

**Fibre and Fibre Tubing**
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

**Field Coils (See Coils).**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Flaxlinum Insulation**
National Railway Appliance Co.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.
Western Elec. Co.

**Floor Plates**
American Abrasive Metals Co.

**Forgings**
Columbia M. W. & M. I. Co.
Eureka Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track. (See Track Work)**

**Funnel Castings**
Wharton, Jr., Inc., & Co., Wm.

**Fuse Mounts**
National Electric Specialty Co.

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Columbia M. W. & M. I. Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

**Fuses, Refillable**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

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Power Specialty Co.
Westinghouse Traction Brake Co.

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General Electric Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

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**Gear Blanks**
Standard Steel Works Co.

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Electric Service Supplies Co.
Thayer & Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
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Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

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General Electric Co.

**Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

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**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.
Western Elec. Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

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Electric Service Supplies Co.
Ohio Brass Co.

**Hacksaws**
Gladium Co., Inc.

**Harps, Trolley**
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Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works
Western Elec. Co.

**Headlights**
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General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
Trolley Supply Co.

**Headlining**
Haskelite Mfg. Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

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Cooper Heater Co.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
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Smith Heater Co., Peter

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Chicago Pneumatic Tool Co.
Columbia M. W. & M. I. Co.
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Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

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Ohio Brass Co.

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Massey Concrete Products Corp.

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Niles-Bement-Pond Co.

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Horne Mfg. Co.

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Schutte & Koerting Co.

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Thompson-Levering Co.
Western Elec. Co.
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General Electric Co.
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Irvington Varnish & Insulating Co.

**Insulation. (See also Paints)**
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Anderson M. Co., A. & J. M.
Dolph Co., J. C.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Insulation, Slot**
Irvington Varnish & Insulator Co.

**Insulators. (See also Line Material)**
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Don-O-Lac Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

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Electric Service Supplies Co.
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General Electric Co.
National Electric Specialty Co.
Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
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**Lanterns, Classifications**
Nichols-Lintern Co.

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Williams & Co., J. H.

**Lathes, Car Wheel**
McCable Lathe & Machinery Corp., J. J.
Niles-Bement-Pond Co.
Western Elec. Co.

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Du Pont de Nemours & Co., Inc., E. I.

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General Electric Co.
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Westinghouse Elec. & Mfg. Co.

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
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Columbia M. W. & M. I. Co.
Dossert & Co.
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Electric Railway Equipment Co
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

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Westinghouse Elec. & Mfg. Co

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Texas Co.
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**Machinery, Insulating**
American Insulating Machine Co

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Belden Mfg. Co.

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Wharton, Jr., & Co., Wm.

**Manganese Steel Special Track Work**
Wharton, Jr., & Co., Wm.

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Electric Service Supplies Co.

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Economy Electric Devices Co.

**Mica**
Mica Insulator Co.

**Mirrors for Motormen**
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Belden Mfg. Co.

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National Metal Molding Co.

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Dossert & Co.

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Brill Co., J. G.
Electric Service Supplies Co.
Wood Co., Chas. N.

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Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Western Elec. Co.

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Rawls Machine & Mfg. Co.

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Columbia M. W. & M. I. Co.
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Ohio Brass Co.
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Brill Co., The J. G.

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Brill Co., The J. G.
St. Louis Car Co.

**Seating Materials**
Brill Co., J. G.

**Second-Hand Equipment**
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Foster Co., H. M.
Hyman Michaels Co.
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Dahlstrom Metallic Door Co.

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Hubbard & Co.

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Western Elec. Co.

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Nachod Signal Co., Inc.
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Wood Co., Chas. N.

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Nuttall Co., R. D.
Star Brass Works

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American Steel & Wire Co.
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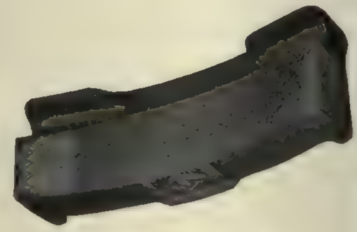

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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Allis Chalmers Mfg. Co. 53
Allison & Co., J. E. 31
American Abrasive Metals Co. 62
Amer. Brake Shoe & Fdry. Co. 61
American Car Co. 65
American Di-Electrics, Ltd. 51
American Electrical Works 47
American Insulating Machinery Co. 47
American Mason S. T. Co. 62
American Ry. Supply Co. 52
American Rattan & Reed Mfg. Co. 57
American Steel Foundries 45
American Steel & Wire Co. 48
Anaconda Copper Mining Co. 47
Anderson Mfg. Co., A. & J. M. 40
Archbold-Brady Co. 46
Archer & Baldwin, Inc. 54
Armco Culvert & Flume Mfgrs. Assn. 13
Arnold Co., The 30
Automatic Reclosing Circuit Breaker Co. 50

B

Babcock & Wilcox Co. 50
Barbour-Stockwell Co. 48
Bates Expanded Steel Truss Co. 39
Bayonet Trolley Harp Co. 39
Beeler, John A. 30
Belden Mfg. Co. 59
Bemis Car Truck Co. 62
Bennett-Field Cross Tie Co. 47
Bonney-Vehslage Tool Co. 52
Bound Brook Oil-less Bearing Co. 20
Bridgeport Brass Co. 6
Brill Co., The J. G. 65
Buckeye Jack Mfg. Co. 61
Byllesby Eng. & Mfg. Corp. 31

C

Cameron Electrical Mfg. Co. 47
Canton Culvert & Silo Co. 41
Clark Mgr. Corp., E. W. 30
Cleveland Fare Box Co. 52
Collier, Inc., Barron G. Back Cover
Columbia M. W. & M. I. Co. 64
Consolidated Car Fender Co. 61
Consolidated Car Heating Co. 32
Continental Fibre Co., The 50
Copper Clad Steel Co. 46
Cooper Heater Co., The 52
Cutter Co. 47

D

Page

Dahlstrom Metallic Door Co. 61
Day & Zimmermann, Inc. 31
Differential Steel Car Co., Tne. 62
Dolph Co., J. C. 51
Don-O-Lac Co., Inc. 51
Drew Electric Mfg. Co. 10
Drum & Co., A. L. 31
Duncan Lumber Company 46
Du Pont de Nemours & Co., Inc., E. I. 21

E

Earll, Chas. I. 53
Eastern Mass. St. Ry Co. 55
Economy Electric Devices Co. 14-15
Electric Equipment Co. 54
Electric Railway Equipment Co. 48
Electric Railway Improvement Co. 48
Electric Service Supplies Co. 7
Electric Storage Battery Co. 57
Eureka Co. 42

F

Feustel, Robt. M. 30
Flood City Mfg. Co. 8
Ford, Bacon & Davis 30
Ford Chain Block Co. 49
Fort Pitt Spring & Mfg. Co. 53
"For Sale" Ads 54-55
Frankel Connector Co. 41

G

Galena-Signal Oil Co. 25
General Electric Co. 26
Gladium Co., Inc. 57
Gold Car Heating & Ltg. Co. 52
Gould Coupler Co. 44
Gould, L. E. 31
Griffin Wheel Co. 31

H

Haskelite Mfg. Corp. 24
"Help Wanted" Ads 54
Hemingray Glass Co. 47
Hemphill & Wells 30
Holst, Englehardt W. 30
Horne Mfg. Co. 53
Hubbard & Co. 46

I

International Register Co., The 42

Page

International Steel Tie Co. Front Cover
Irvington Varnish & Insulator Co. 38

J

Jackson, Walter 31
Jeandron, W. J. 45
Johnson Fare Box Co. 17

K

Kelly, Cooke & Co. 30
Kuhlman Car Co. 65

M

McCardell & Co. 46
Massey Concrete Products Co. 38
Metal & Thermit Corp. 16
Mica Insulator Co. 51
Miller Trolley Shoe Co. 34
More-Jones Brass & Metal Co. 53

N

Nachod Signal Co., Inc. 46
National Brake Co. 29
National Carbon Co., Inc. 57
National Electric Specialty Co. 49
National Pneumatic Co., Inc. 9
National Railway Appliance Co. 61
National Tube Co. 46
Nelsonville Brick Co. 62
New York Switch & Crossing Co. 49
Nichols-Lintern Co. 61
Niles-Bement-Pond Co. 43
Nuttall Co., R. D. 37

O

Ohio Brass Co. 5

P

Parsons, Klapp, Brinckerhoff & Douglas 30
Perey Mfg. Co., Inc. 52
Positions Wanted and Vacant 54
Post & Co., Inc., E. L. 57
Power Specialty Co. 50

R

Rail Joint Co. 49
Railway Improvement Co. 23

Page

Railway Track-work Co. 12
Railway Utility Co. 62
Ramapo Iron Works 57
Rawls Machine & Mfg. Co. 48
Richey, Albert S. 30
Roebling's Sons Co., John A. 46
Rooke Automatic Register Co. 57

S

St. Louis Car Co. 45
Samson Cordage Works 61
Sanderson & Porter 30
Sangster & Matthews 30
Scaife & Sons Co., Wm. B. 50
Schutte & Koerting 50
Searchlight Section 54-55
Sherwin & Williams Co. 59
Silver Lake Co. 53
Smith & Co., C. E. 30
Smith Heater Co., Peter 52
Smith-Ward Brake Co. 57
Standard Steel Works Co. 35
Star Brass Works 61
Stone & Webster 30
Stucki Co., A. 57

T

Terry Steam Turbine Co. 22
Texas Co., The 33
Thayer & Co. 43
Thompson-Levering Co. 49
Tool Steel Gear & Pinion Co. 36
Trolley Supply Co. 53
Tubular Wover Fabic Co. 18

U

U. S. Electric Signal Co. 47
United States Graphite Co. 45
Universal Lubricating Co. 19

W

"Want" Ads 54
Wason Mfg. Co. 65
Western Electric Co. 11
Wesstinghouse Elec. & Mfg. Co. 2, 41
Westinghouse Traction Brake Co. 4
Wharton, Jr., Co., Wm. 48
White Electrical Supply Co. 10
White Engineering Corp., J. G. 30
Williams & Co., J. H. 53
Wish Service, The P. Edw. 31
Wood Co., Chas. N. 46

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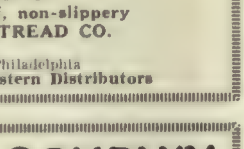

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This year's convention will be particularly important because the field is embarking on the biggest rehabilitation program in its history. For the first time since the war, electric railway finances are showing a decided upward trend. Track reconstruction, extensions, new rolling stock and improvements on the line, in the shops, substations and power plants will multiply rapidly from now on. These facts will form a background for discussions that will interest every electric railway man and should interest every progressive manufacturer. One of the big topics of the day is the advantage of organizing all departments of an electric railway property to help sell transportation. This movement will be stimulated at Convention time. It will help every man who can help electric railways to get more net revenue from more riders. This year's convention should be the most important that has been held since the war. In connection with this event,

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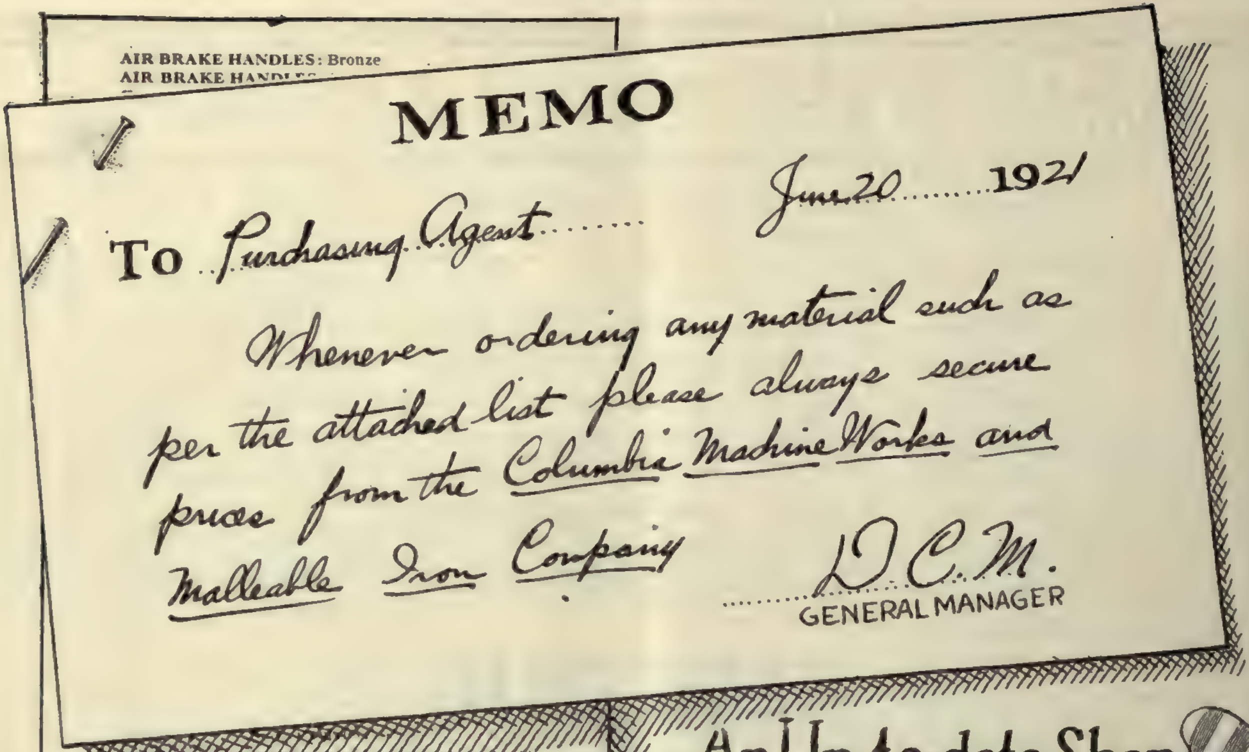
Electric Railway Men — the big men in the field — are waiting to hear you tell them in the Annual Convention Issue of the *Electric Railway Journal.*

**ELECTRIC RAILWAY JOURNAL, Tenth Ave. at 36th St., NEW YORK**



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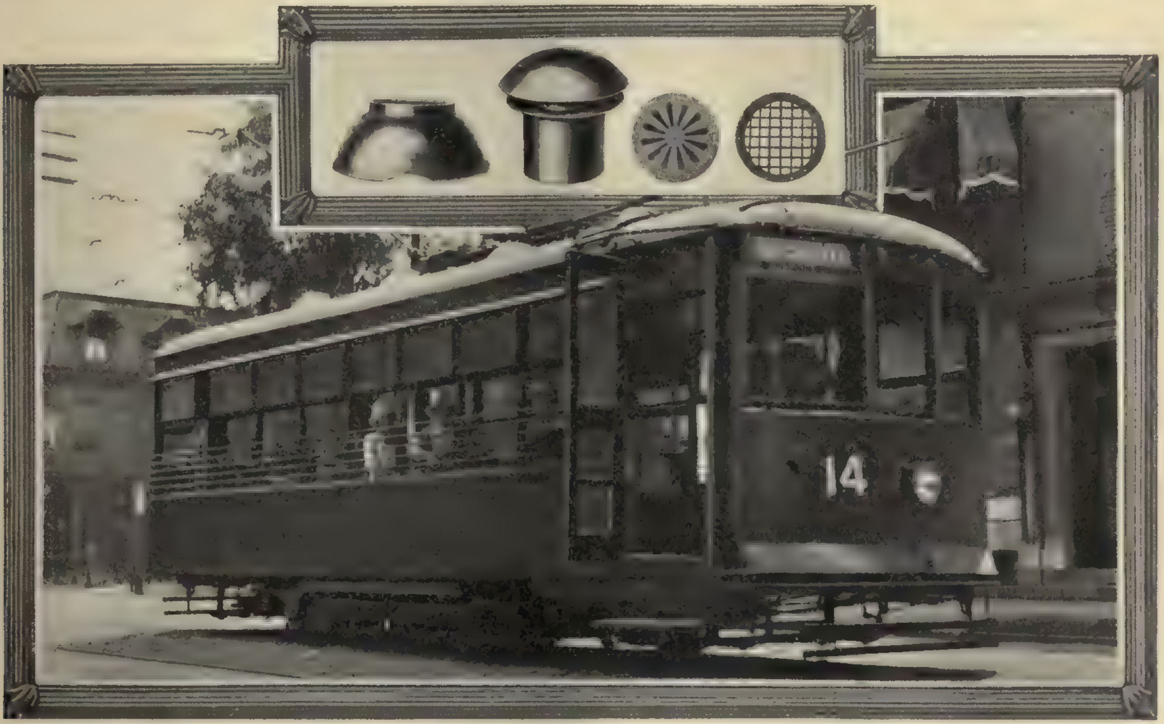

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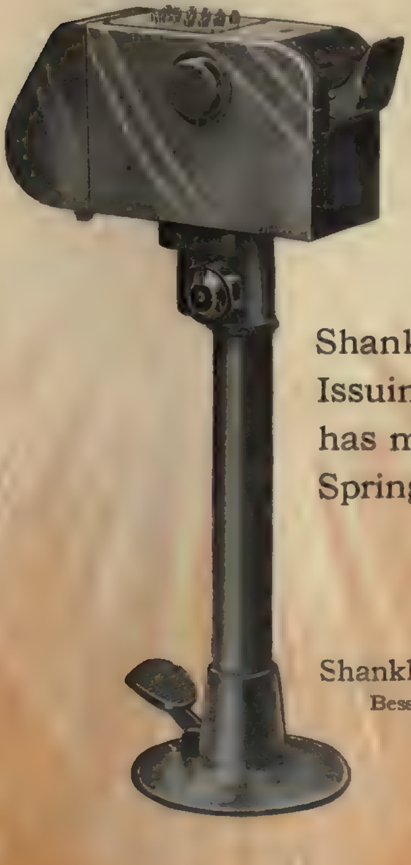

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# Westinghouse

*Vol. 58, No. 4* New York, July 23, 1921 ***Pages* 119 *to* 156**

# Electric Railway Journal

**HENRY W. BLAKE and HAROLD V. BOZELL, Editors** **HENRY H. NORRIS, Managing-Editor**

## *Contents*

### Methods of Constructing a Mile of Paved Track a Day

**Eighty-two miles of track to be built by the Detroit Municipal Railway this summer. Rigid type construction with heavy plain girder rail, seam-welded joints and steel ties, is used. Unusual methods employed to expedite extensive construction program........................................Page 121**

### Reduced Fare in Cleveland

**On July 10 the Cleveland Railway began a thirty-day experiment with a 2½-cent ticket fare and a 3-cent cash fare for downtown riders. This fare reduction is made in an effort to stimulate the riding habit and increase the company's revenues........................................Page 130**

### Motor Truck Haulage in Chicago Produces Business

**The North Shore line has a receiving station close to the Chicago Loop and hauls merchandise on trucks to the rail terminal. A study shows the service to be costly taken by itself, but valuable as a business producer......Page 133**

EDITORIALS .............................. 119

PRIZES FOR ACCIDENT REDUCTION............ 131

MERCHANDISING TRANSPORTATION............ 131

EMPLOYMENT DATA FOR JUNE, 1921........... 132

DIRECTION OF FIBERS AFFECTS STRENGTH OF FIBER BOXES.............................. 135

ELECTRIC RAILWAY PUBLICITY.............. 136

EQUIPMENT AND ITS MAINTENANCE:
- Plow and Circuit-Breaker Testing in Washington........ 139
- Large Automobile Interests Enter Motor Bus Field...... 139
- New Variable Voltage Welding Set.................... 140
- Greasing and Cleaning Tracks........................ 140
- Rubber Spring Blocks Improve Riding Qualities of Bus.. 141
- Freight Locomotive for New York Municipal Railway.... 141
- Thermal Stresses in Steel Car Wheels................ 142
- New Combination Stop Sign and Strain Insulator....... 142
- Small Oven Proves Useful............................ 142

BERLIN'S EIGHT-RIDE PUNCH TICKET......... 143

WARNINGS ON COAL......................... 143

AMERICAN ASSOCIATION NEWS................ 143

NEWS OF THE ELECTRIC RAILWAYS............ 144

FINANCIAL AND CORPORATE.................. 147

TRAFFIC AND TRANSPORTATION............... 150

PERSONAL MENTION......................... 154

MANUFACTURES AND THE MARKETS............. 155

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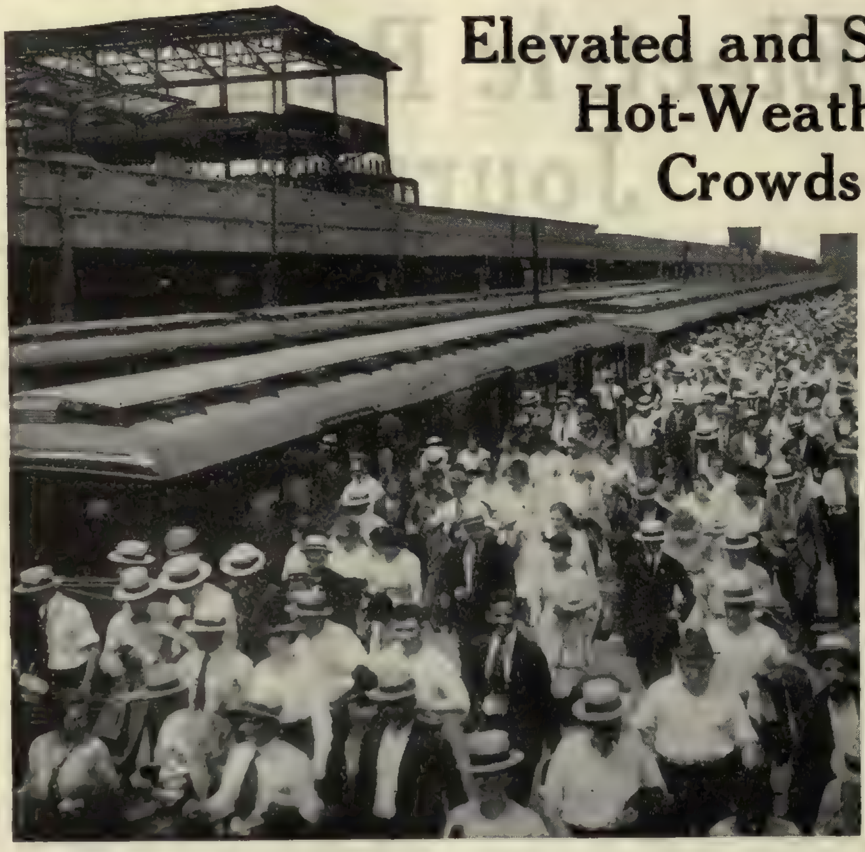

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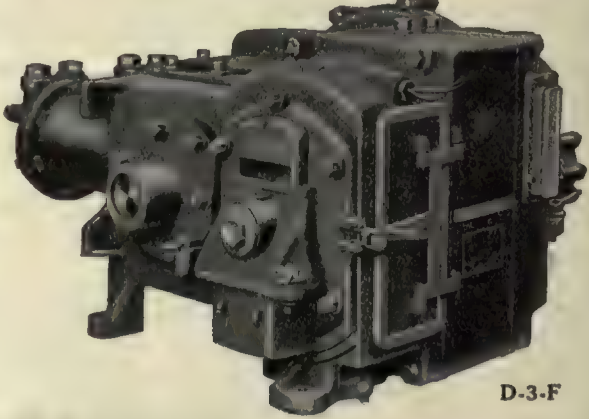

D-3-F

*The latest improved-type cars of the New York Municipal Railway are equipped with the D-3-F*

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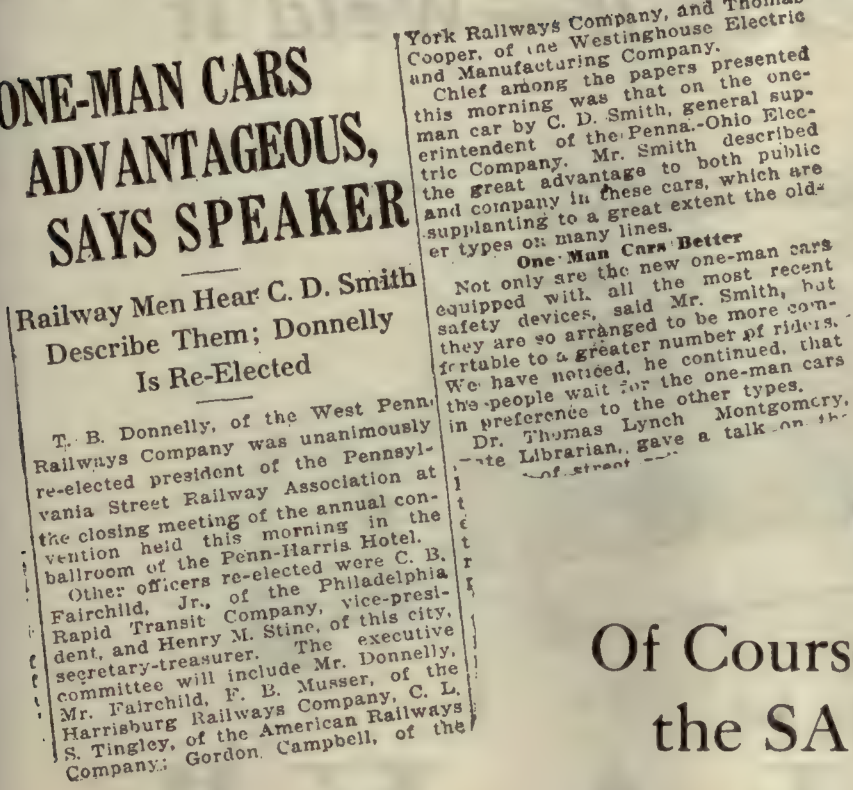


## ONE-MAN CARS ADVANTAGEOUS, SAYS SPEAKER

### Railway Men Hear C. D. Smith Describe Them; Donnelly Is Re-Elected

T. B. Donnelly, of the West Penn Railways Company was unanimously re-elected president of the Pennsylvania Street Railway Association at the closing meeting of the annual convention held this morning in the ballroom of the Penn-Harris Hotel.

Other officers re-elected were C. B. Fairchild, Jr., of the Philadelphia Rapid Transit Company, vice-president, and Henry M. Stine, of this city, secretary-treasurer. The executive committee will include Mr. Donnelly, Mr. Fairchild, F. B. Musser, of the Harrisburg Railways Company, C. L. S. Tingley, of the American Railways Company; Gordon Campbell, of the York Railways Company, and Thomas Cooper, of the Westinghouse Electric and Manufacturing Company.

Chief among the papers presented this morning was that on the one-man car by C. D. Smith, general superintendent of the Penna.-Ohio Electric Company. Mr. Smith described the great advantage to both public and company in these cars, which are supplanting to a great extent the older types on many lines.

**One Man Cars Better**

Not only are the new one-man cars equipped with all the most recent safety devices, said Mr. Smith, but they are so arranged to be more comfortable to a greater number of riders. We have noticed, he continued, that the people wait for the one-man cars in preference to the other types.

Dr. Thomas Lynch Montgomery, ate Librarian, gave a talk on th of street

*"In Public Service we must take constant note of the Public Pulse and allow our practices to be influenced largely by Public Opinion."*

## Of Course He Refers to the SAFETY CAR

Comfort is a factor to be reckoned with in considering how a greater portion of the Public can be induced to acquire the "car-riding" habit.

Safety Cars, light, open and airy in summer and snugly sealed in winter, built for short stops, quick starts and fast, smooth runs between stations, as well as operating on shorter headways, have given the Public a new standard of comfort and convenience in street railway travel.

The Public has invariably evidenced its appreciation by increased patronage.

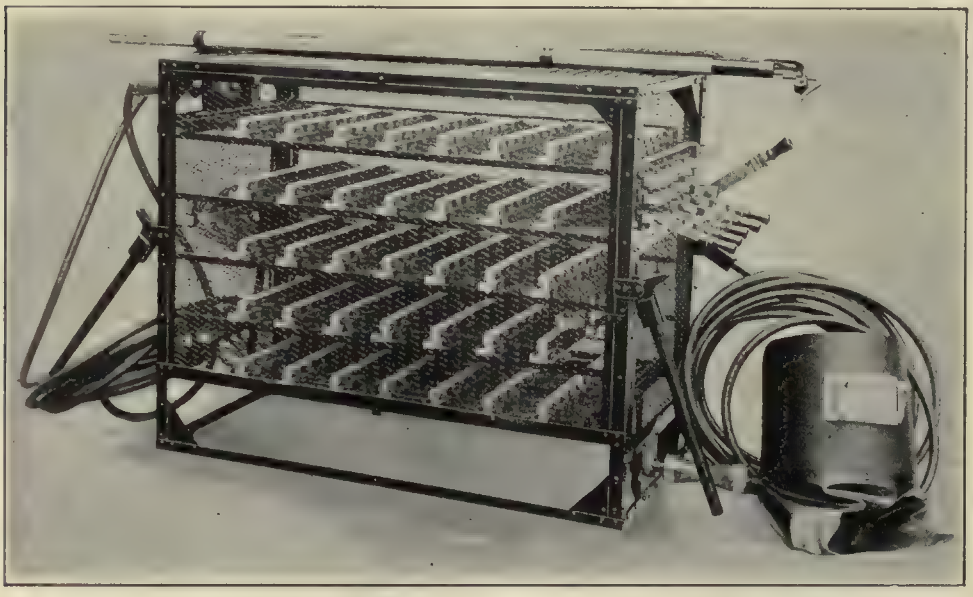
Safety Car comfort is mental as well as physical, since the passenger has the pleasant prospect of a ride under conditions that provide a positive safeguard against every contingency.

*It is not a Safety Car unless safeguarded with our standard Air Brake and Safety Car Control Equipment.*

**SAFETY CAR DEVICES CO.**
**OF ST. LOUIS, MO.**
*Postal and Telegraphic Address:*
**WILMERDING, PA.**

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

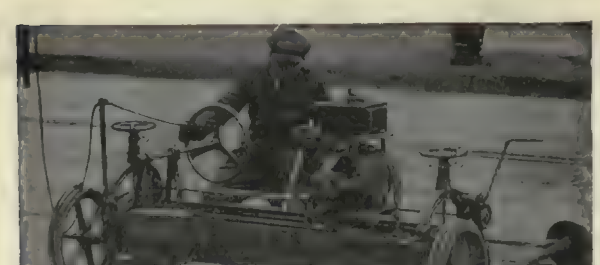
*Don't Scrap It—Weld It*



"AJAX"

Electric Arc Welder

We did not place Ajax welding equipment on the market until we satisfied ourselves after three years' research and exhaustive tests that it would satisfy you, as a fitting companion for our popular track grinders. When you buy this welder you get the latest development in the art—a 120-pound, portable, high capacity unit. Note the simplicity of construction.



Atlas Rail Grinder

Our Track Grinders

Atlas, Universal and Reciprocating are so well known that we mention them here to establish your confidence in our new Ajax welder.

Railway Track-work Co.
3132-48 East Thompson St.
Philadelphia, Pa.

# O-B Lock Trolley Hangers

## weather-tight and time-proof suspensions

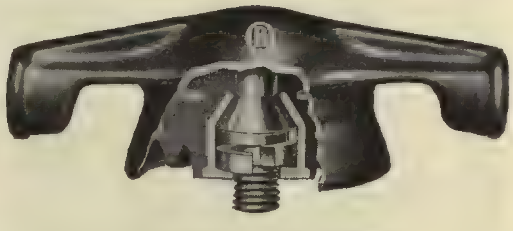
Every ear fits up tightly to every O-B Lock Hanger.
The drawings show how.

Ear and hanger are a rigid unit. The threads are shielded from the weather—vibration between ear and hanger is absent. With O-B Lock Hanger you have a tighter, smoother line of longer life.

O-B Lock Hanger is a self-contained unit, as easy to install as the usual round top hanger. The spring (which is not a lock washer) is specially made of heavy steel.

O-B Lock Hanger costs less today than the ordinary hanger did last year. Order some now and see their virtues for yourself.

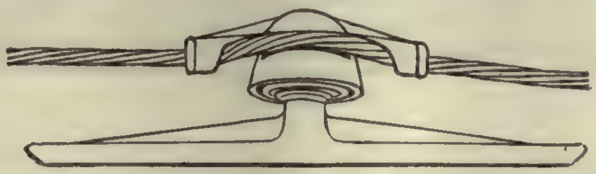
*Prompt Shipments.*



**O-B Type F Lock Hanger**

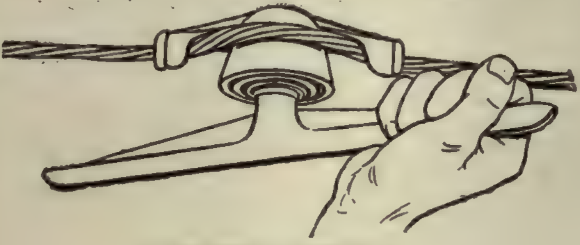
When the ear is tightened it pulls down the stud against the heavy spring. The hanger is a self-contained device with no loose parts.

### Here's the way O-B Lock Hanger Works

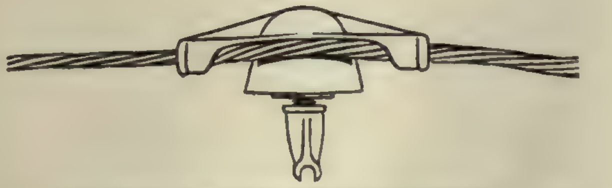


**Usually the ear is out of line with the trolley wire when it first makes contact with the hanger**

### With Ordinary Hanger—

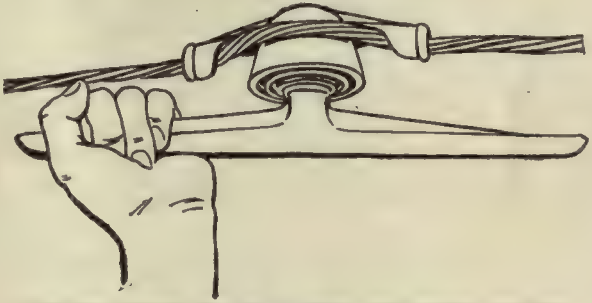


**the ear must be backed off—**

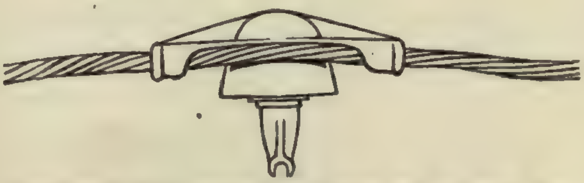


**which leaves a loose joint between ear and hanger.**

### With O-B Lock Hanger—



**after first contact, the ear is rotated still further, the stud is pulled down and compresses a heavy spring and the result is—**



**tight, solid joint between lock hanger and ear when the latter comes in line with the wire.**

## The Ohio Brass Co., Mansfield, Ohio

New York Philadelphia Pittsburgh
Chicago Los Angeles
San Francisco Paris, France

*Products*: Trolley Materials; Rail Bonds; Car Equipment; Third Rail Insulators; High Tension Porcelain Insulators.

Thermit-Welding Motor Cases in Toledo

# Toledo Makes Substantial Savings in Reclaiming Broken Motor Cases and Truck Frames by Thermit Welding

We quote from a letter received from Mr. F. W. Clark, Toledo Railway & Light Company, Toledo, Ohio:

"About ten years ago Mr. C. A. Brown, our master mechanic secured a Thermit welding outfit and turned it over to me to operate. While I have never made any miraculous welds or perhaps done anything out of the ordinary, yet I think that I have been very successful in this work. Whatever success I may have had is due to the absolute dependability of the Thermit Process, coupled with a little common sense. I have made about one hundred welds and saved the company several thousand dollars.

"My welds have nearly all been made on motor cases and truck frames. Our later cars are all equipped with more recent types of motors and forged truck frames which do not break so readily.

"As soon as a motor case or truck frame breaks it is welded and in a few hours the car is out on the road doing business again. Every weld I have made is still in service and I have never had one break in the weld, for any casing or forging welded by the Thermit process is stronger than it was originally.

"There has been a remarkable saving made, for a casting can be welded for a fraction of a cost of a new one, is stronger than it was in the first place and only keeps the car out of service for a few hours. The cost of welding a motor case, including labor and material, varies around $35 depending on how badly it is broken and how much machining is necessary to refinish and drill it. A truck frame weld costs on an average about $15, for it is seldom that any machine work is necessary. The cars having the welded truck frames under them are the large, double-truck, pay-enter, closed vestibule type, 42 ft. long, and weighing about 36,000 lbs."

***Send for our latest Pamphlet 3932***

# METAL & THERMIT CORPORATION

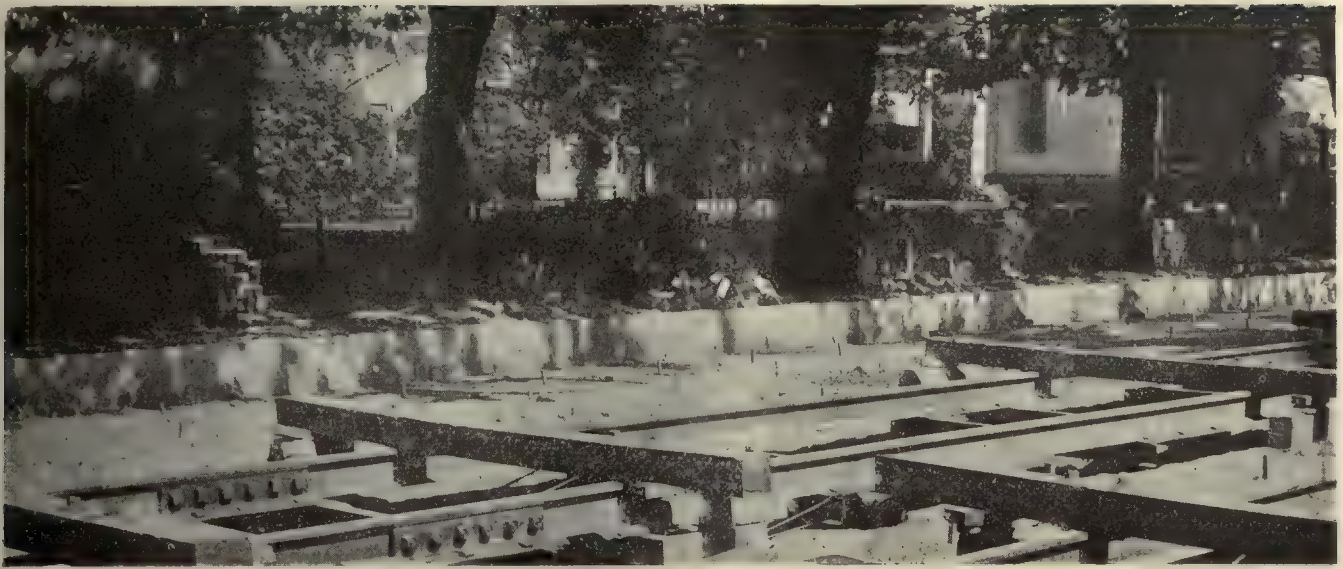
**Boston**
**Pittsburgh**
**Chicago**

**120 Broadway**

SERVICE STRENGTH
THERMIT WELDING
ECONOMY

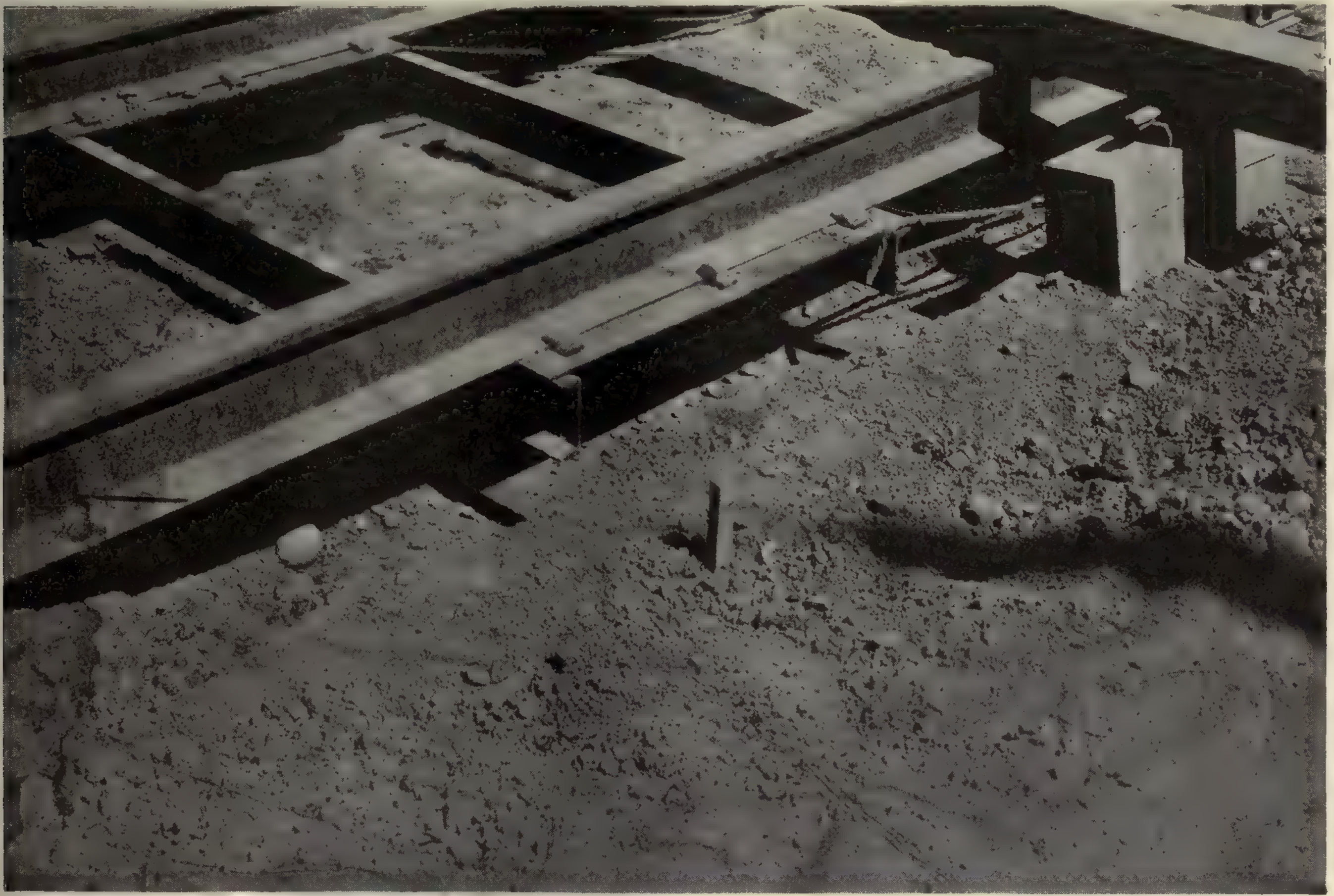
**New York**

**Toronto**
**South**
**San Francisco**



## Watch the 82%

IN a typical track design with wood ties, (Type D track AERA Proceedings 1914, Page 487) 82% of the cost below the base of rail is excavation and concrete. Here is the obvious place for economy! STEEL TWIN TIE TRACK saves excavation and concrete.



**Steel Twin Tie Track**

**THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio**

*International Steel Twin Ties manufactured and sold in Canada, by Sarnia Bridge Co., Ltd. Sarnia, Ont.*

# SELECTION

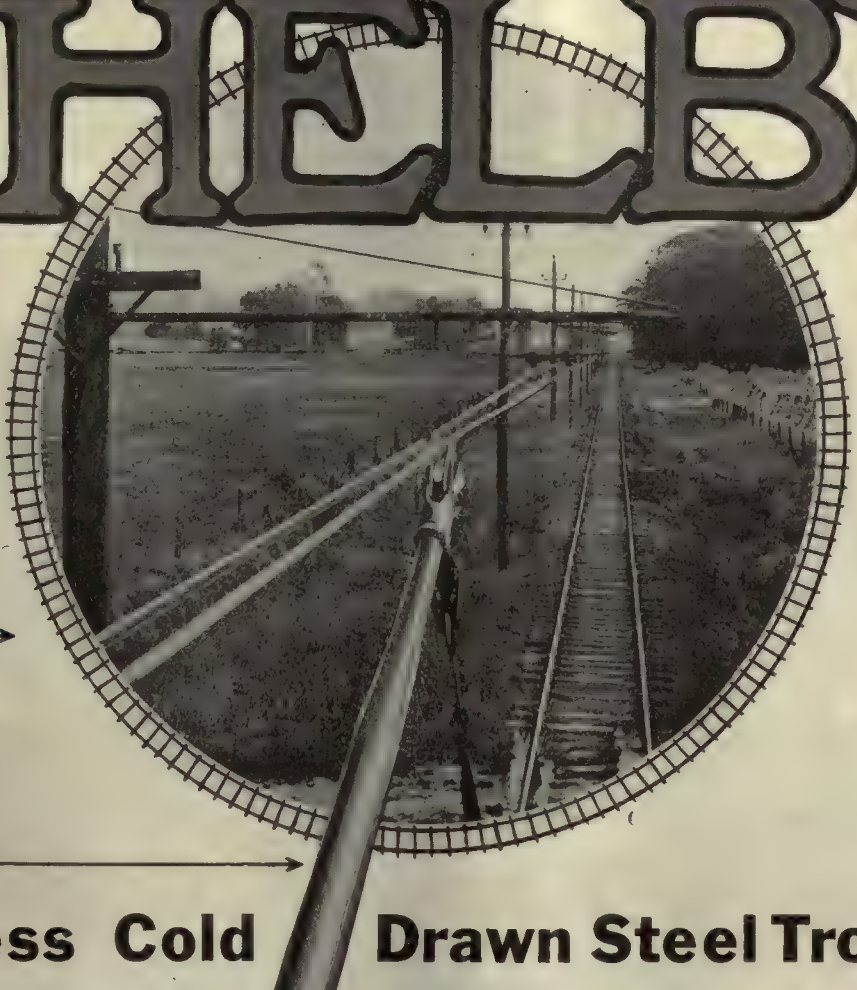
Like a range rider roping a steer from the herd, the *selective* operation of the CONDIT Type A-1 Relay isolates "faults" from the system. And does it exactly in accordance with your predetermined requirements. Extreme accuracy, permanency of operation, inverse-definitive characteristics, "non-creeping," high torque with low energy consumption, and instantaneous re-setting. Costs more—"and it's worth it." *Bulletin No.* 417.

CONDIT ELECTRICAL MFG. CO.
*Manufacturers of Electrical Protective Devices*
Boston 27, Mass.
*Northern Electric Company*
LIMITED
*Sole Distributor for the Dominion of Canada.*

122-30

CONDIT

# SHELBY



## Seamless Cold Drawn Steel Trolley Pole

## *Where There's Strain THERE'S STRENGTH*

In construction SHELBY TROLLEY POLES have much in common with fishing poles. Sudden jerks and drags exert strains on the butt of the pole in each case. Thus the butt must be stronger and yet the entire pole must be as light as possible.

Look again at the illustration of the SHELBY TROLLEY POLE. Note how the weight of the pole gradually reduces toward the point where the strain is lightest. In addition to its increased diameter the butt of the SHELBY POLE is reinforced on the inside, the reinforcement being made of the same material of which the pole is constructed—13 gauge Seamless Cold Drawn Steel. This reinforced member is made integral with the pole, its length varying to suit the requirements of strength

SHELBY TROLLEY POLES are made in two types—Standard A and Standard B. While the three diameters remain the same in both poles the taper lengths vary, making Standard B pole about 20 per cent heavier and 50 per cent stronger.

***Every pole is tested in a specially designed machine which infallibly detects any imperfection, and any which does not stand the test is rejected.***

# ELECTRIC SERVICE SUPPLIES CO.

***Manufacturer of Railway Material and Electrical Supplies***

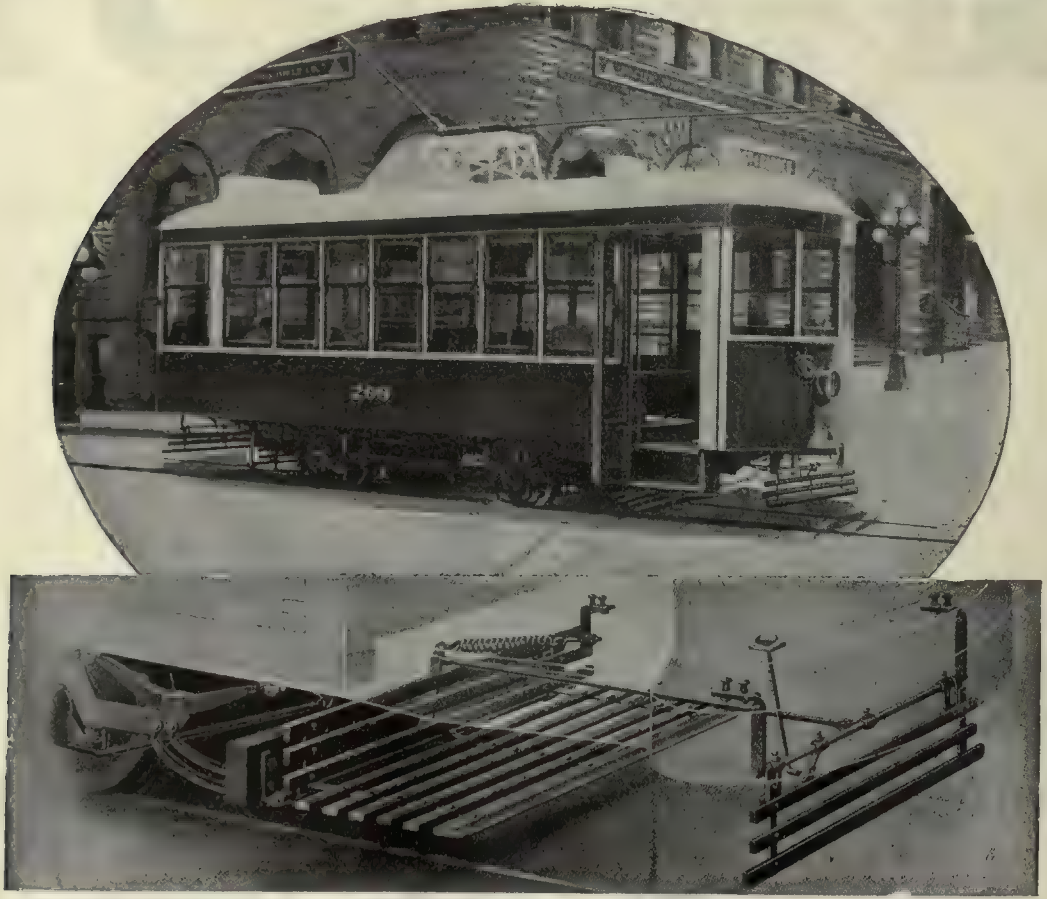
**PHILADELPHIA**
**17th and Cambria Streets**

**NEW YORK**
**50 Church Street**

**CHICAGO**
**Monadnock Block**

***Branch Offices:*** **Boston, Scranton, Pittsburgh**
**Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver.**

*Complete the Safety Equipment*



**H-B Life Guards**

***—For TRULY Safety Cars***

On your safety cars you install every known device for the protection and safe transportation of your passengers inside the car.

Then don't neglect the equally important safety of those outside the car, the infirm man, the slow-moving woman, or the heedless child who may stumble unexpectedly into the pathway of the onrushing car.

H-B Life Guards are the highest development of automatically acting lifeguard.

***They function independently of motorman.***

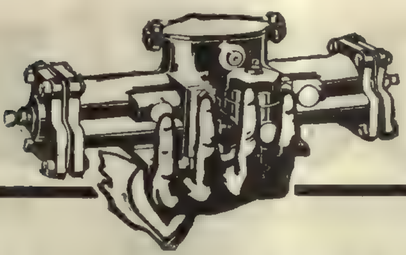
**The Consolidated Car Fender Co., Providence, R. I.**

***General Sales Agent***

**Wendell & MacDuffie Co.**

**61 Broadway, New York**

*Modernize!*



*Pneumatize!*

# With the Big Five to Meet the "Hurry Safely" Standards of Today

1—National Pneumatic Door and Step Control, the standard for the safety car to the heaviest surface and rapid transit operation, for eliminating manual effort in door and step operation to permit the operator to do better those services that can't be done by machinery.

2—National Pneumatic Door and Step Operating Mechanisms to permit the door engines to work longest with greatest ease and least power through proper proportioning and balancing of the levers and other parts, and through the use of longest-wear materials.

3—National Pneumatic Motorman's Light Signals by which the closing of the door produces instantaneously a light signal to the motorman.

4—National Pneumatic Safety Interlocking Door Control by which the closing of the doors—and only the closing of the doors—puts the car under way automatically from the first notch of the controller.

5—National Pneumatic Multiple Unit Door Control whereby part or all the doors in an entire train are placed under the control of one guard with full safety interlocking.

Our wide experience is at your beck and call to adapt one or more of these "hurry safely" means to your conditions.

## National Pneumatic

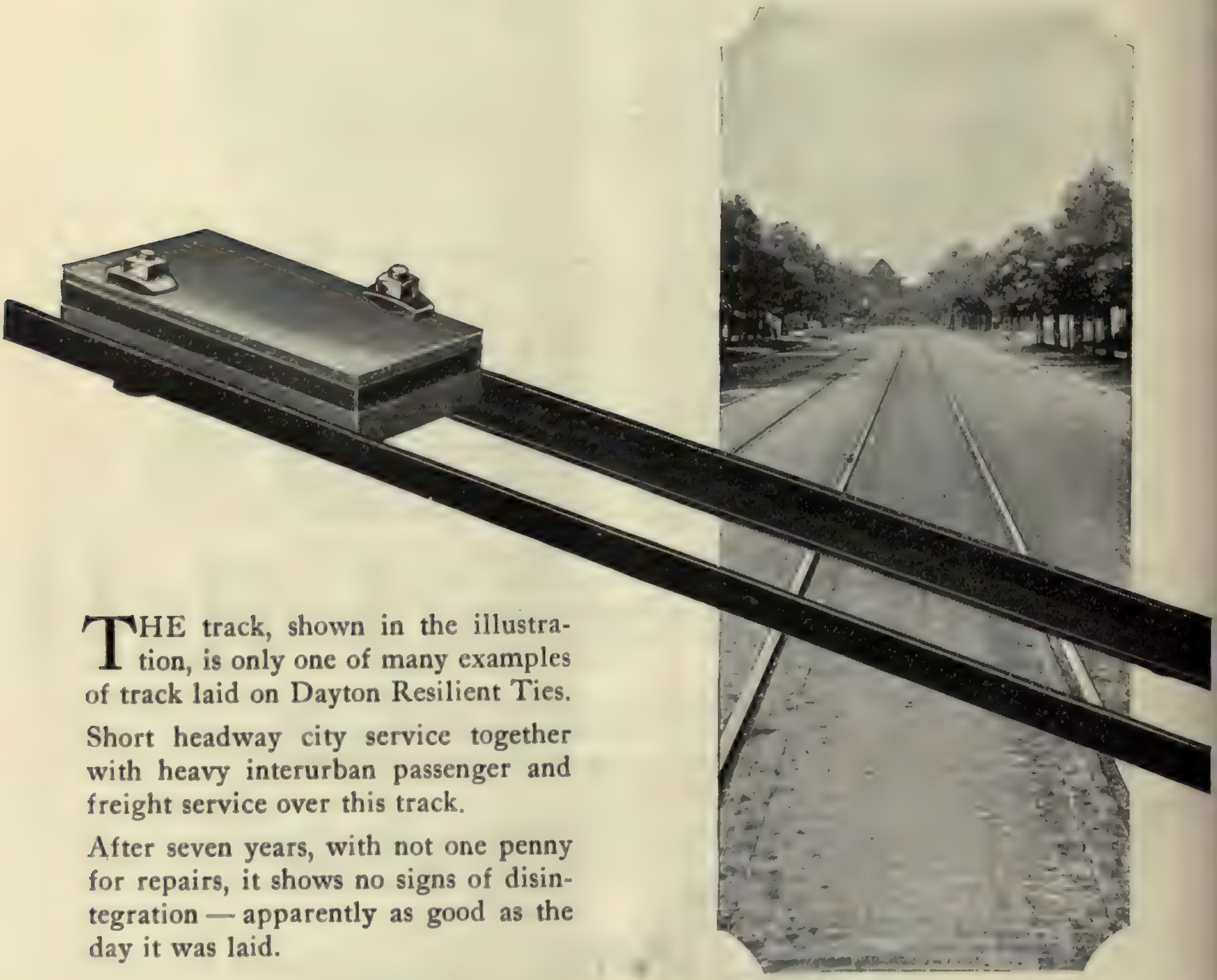
Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

***Manufactured in Canada by***
**Dominion Wheel & Foundries, Ltd.**
**Toronto, Ont.**

National Pneumatic Company, Inc.
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

# REDUCE FIRST

## Save $6,000 Per Mile over Track Laid on Wood Ties in Concrete Foundation



THE track, shown in the illustration, is only one of many examples of track laid on Dayton Resilient Ties.

Short headway city service together with heavy interurban passenger and freight service over this track.

After seven years, with not one penny for repairs, it shows no signs of disintegration — apparently as good as the day it was laid.

# DAYTON

# COST of New Track

## Save $2,000 Per Mile over Track Laid on Wood Ties in Gravel Ballast

IF you are going to lay new track you certainly want to do the job right and at the least possible first cost. You also want to secure a track that will not have to be relaid in a short time nor require constant repairing to the joints and to the street paving adjacent to the rails.

Here are five reasons why Dayton Resilient Ties will save you money both now and hereafter on all track work:

***(1) Reduce First Cost*** $6,000 a mile saved over wood ties in concrete foundation or $2,000 a mile saved over wood ties in gravel ballast.

***(2) Longer Life to Track*** Track laid on Dayton Resilient Ties will last longer than any other track construction known to date, because the resilient wood and asphalt construction of these ties preserves the track foundation from disintegration caused by vibrations and shocks. Therefore, Dayton Resilient Ties directly overcome the cause of all track failure.

***(3) Reduce Track and Paving Repairs*** Paving along the track, especially at the joint, will not heave up or settle down, as the cause of this heaving and settling (the disintegration of the foundation) is removed.

The joint tie is so constructed that it affords a broad bearing surface for the rail. This gives additional strength and resiliency to the most vulnerable portion of the track, enabling it to withstand the blows and shocks to which it is subjected. The steel plate on the joint tie, in addition to acting as a reinforcement, serves as a welding base and eliminates the necessity of copper bonding.

***(4) Reduce Upkeep of Rolling Stock*** Ordinary repairs for rolling stock run into large figures, but they increase 100% when cars must operate over bad track.

It has been demonstrated beyond dispute that there is only one way to avoid these conditions, and that is through the application of resiliency in your track construction.

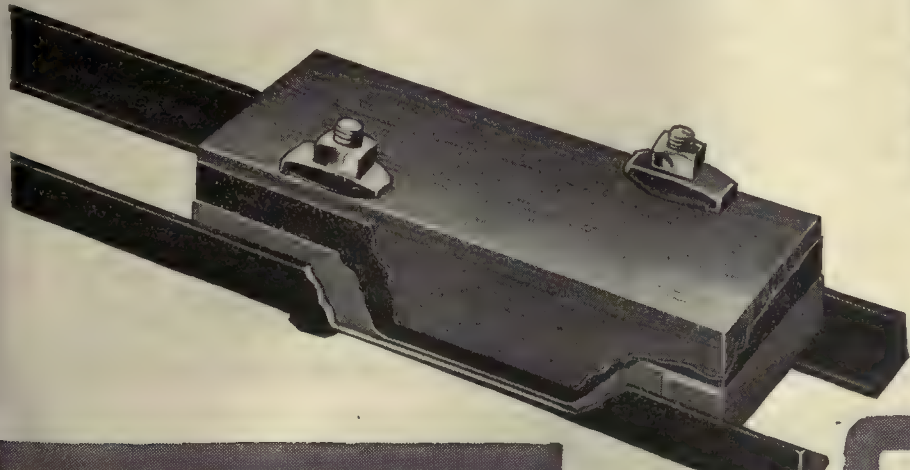
Think how carefully you guard the car body—trucks, motors, etc., by applying resiliency in their construction. Why not, then, give the same consideration to the base on which the whole structure rests?

***(5) Reduce Traffic Noise*** Noise resulting from the moving cars is surprisingly reduced through the use of Dayton Resilient Ties. This alone is proof that the hammer blows and vibration are being absorbed and dissipated before they have a chance to do their deadly work on the foundation and rolling stock.

In the near future it will be practically impossible to obtain wooden ties. They are increasing in cost every day. Even now their cost is practically prohibitive. Therefore, if you can build a track with a tie that will reduce your first cost to considerably less than with wooden ties and give you better service, is there any reason why you should not use them?

You want to save money on that next track job—and you want to get a better track. Have the absolute facts about track construction laid before you. Just tear off the coupon in the corner and hand it to your stenographer. It will bring you complete literature on Dayton Resilient Ties and tell you about the experience of others in the saving through their use.

The Dayton Mechanical Tie Company
711 Commercial Building
Dayton, Ohio



**Resilient TIE**

PIN TO LETTER

**Dayton Mechanical Tie Company**
**711 Commercial Bldg.,**
**Dayton, Ohio**

Without obligation, please send me full information about your Dayton Resilient Ties.

A SOUND bond pays stabilized interest in periods of financial stress, exactly as in normal times. Government and municipalities may abandon proposed activities—but they continue to pay interest on their bonds.

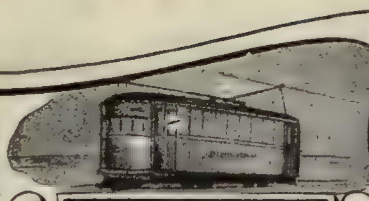
Similarly, when *business conditions* are being readjusted, there is great satisfaction in knowing the income from car card space is guaranteed by Collier Service.

Advertisers may reduce appropriations or change plans, but car card space entrusted to the Collier Organization will continue to pay the stipulated income, year after year.

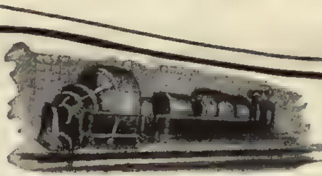
A Collier Contract for definite income from such space is good as a sound bond, whether it deals with a property that operates six cars or six hundred.

**Barron G. Collier**
INCORPORATED

CANDLER BLDG NEW YORK



The World's best Lubricants



# Weighed in the Scales of Service

*Lubricating oils* may be measured in gallons, but *lubrication* can be correctly measured only by the gauge of *service rendered.*

Lubricating value can be secured from oils in the same proportion that it is carried in their physical make-up—and no more.

Figuring lubrication costs by gallonage prices of oil is on a par with figuring efficiency in employees by their avoirdupois.

Galena Oils are the products of years of experience in the requirements of railway lubrication. Only the highest grade stocks enter into the special process of their manufacture. It is *quality* that endows them with ability to carry their lasting, protective film and render in mileage double the service of ordinary oils.

In the scales of *Service* the weight of Galena superiority is quickly evident. On hundreds of electric railways these oils are proving the truth of the assertion: "It is not the gallon of oil, but the lubrication units the gallon contains—that count!"

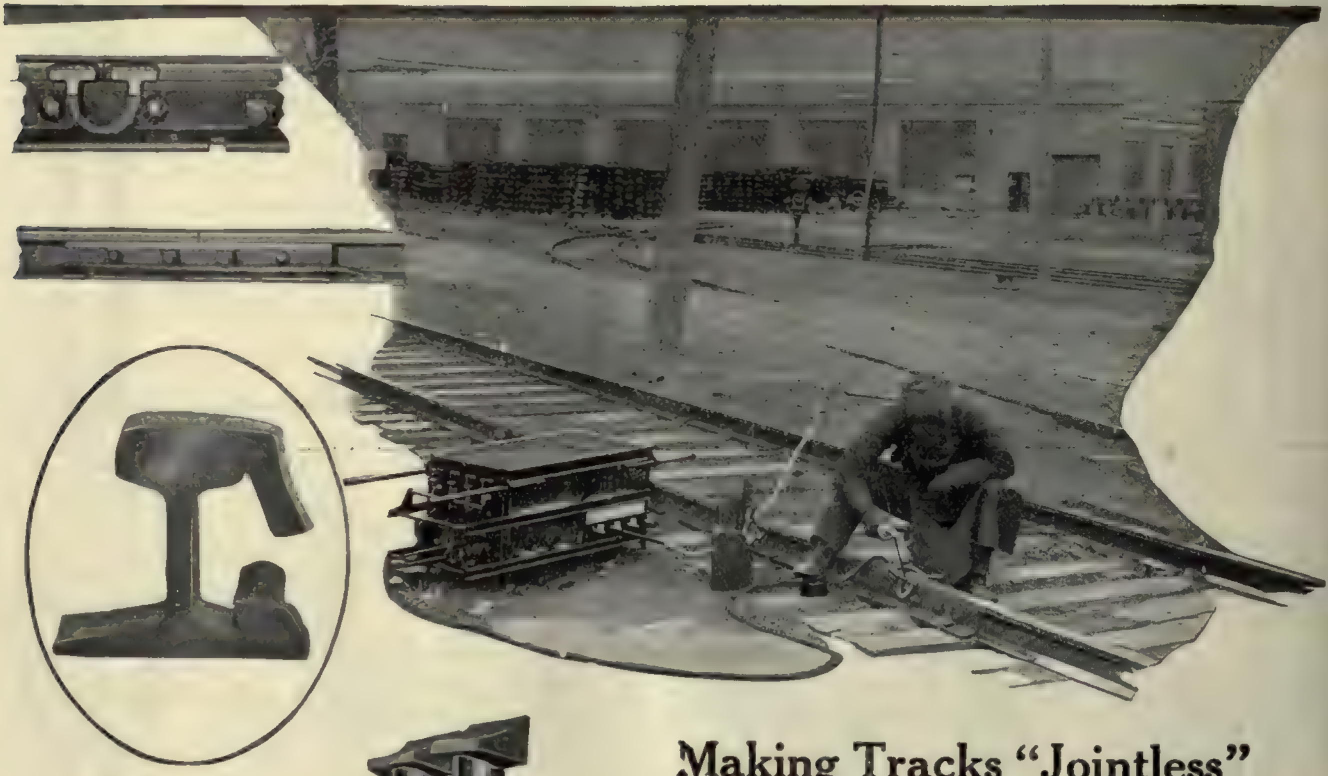
*Galena Quality Is Our Bond*
*and Your Security!*

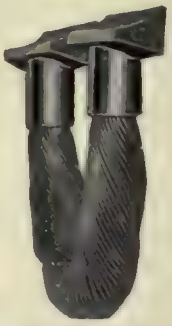
TRIGRAM G S O C TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
*Offices in all principal American Cities*
LONDON BUENOS AIRES PARIS

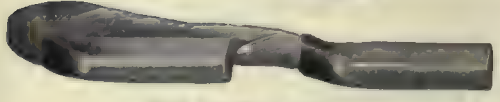
GALENA SERVICE

*A rail as long as the system and without a joint would be ideal for the power service of a street railway*

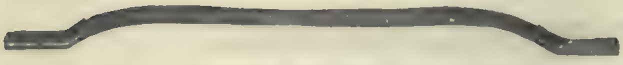




**SF-1 Arc Weld Bond**
For attaching to
Rail Head



**SF-4 Arc Weld Bond**
For use with Weber Joints



**SF-6 Arc Weld Bond**
For attaching to rail base

## Making Tracks "Jointless" with G-E Welded Bonds

Welding a bond to a rail today need not be the troublesome task of fusing copper with steel. G-E Rail Bonds have steel faces expertly arc welded in the factory to drop forged copper terminals. Thus a track welder merely makes the perfect steel weld he is used to, and the bond becomes an integral part of the track—wiping out the joint.

G-E Welded Rail Bonds, either U-shaped for rail heads or of the flexible, long type for spanning splice bars are the outgrowth of broadest experience in railway work. They can be supplied in forms to satisfy any need.

**General Electric Company**

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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*Volume* 58 New York, Saturday, July 23, 1921 *Number* 4

### Avoiding Losses as Important as Increasing Earnings

TO LOWER the operating ratio is the particular concern of every interurban manager at this time. This is leading to an energetic search for new business to counteract the falling off in normal regular business, but another equally important pursuit to the same end is the curtailment of the outgo of money earned.

An example of unavoidable expenditure is the payment of lost and damage claims on merchandise handled. Some figures presented on the Central Electric Railway Association boat trip and published in this paper show that in 1920 thirty-four out of sixty-six interurban member companies of the Central Association paid out $142,744 in freight claims. This association has taken steps to start a campaign of education among employees who handle freight and among the shippers to secure better marking, packing, billing, loading and handling. A similar campaign conducted by the American Railway Express Company has brought remarkable results, and gives promise of marked savings for the effort on the electric lines. The companies in the Central territory should give full measure of co-operation in making this campaign effective, and the idea is well worth emulation by groups of companies or individual companies in other sections. If expenditures such as these, which are purely waste, can be eliminated, the results will be helpful on the general showing of the individual companies and of the industry as a whole.

### Making the Most of the Public's Representatives

ONE of the major reasons for whatever success has been had with the Tayler franchise in Cleveland is embodied in the habit of John J. Stanley to secure the personal friendship and respect of the city councilmen, particularly those who serve on the local transportation committee. This is not incidental with Mr. Stanley; it is his first order of business. He gives these matters his personal attention and sits in all meetings in which the company is concerned so that he may be on hand to answer any questions, or to explain away any misconceptions of the street railway business that may arise. When he is sitting across the table from an alderman, whom he addresses by his front name and who, in turn, knows Mr. Stanley as "John," there will hardly be a disposition on the part of that public representative to take action without full and fair discussion, and that is the way it has worked out. Probably because it is the easier way, many railway executives hold themselves aloof from the meetings and particularly from the personal friendship of the public officials. They are busy with other things and send some one down in the organization to listen in at the meeting (not take part in it), and report back what the committee or Council did. How much better it is to have the final authority of the company present as an active participant. It is human nature for aldermen to appreciate the attentions of no lesser person than the chief official of the company. And if he is just "John" to them, the company's interests, while fair and right, are not likely to suffer severely.

### Plan How to Remove Fare Discriminations and Inconsistencies

DURING the period when rates were advancing, the simplest method of making the change from a lower to a higher rate of fare was usually a horizontal increase, as from 5 cents to 6, 7 or 8 cents. The reason for this is not far to seek. No matter how thoroughly a community recognized the need of the railway for more money and became reconciled to a higher fare, the change could never be a particularly popular one. The public was willing to accept it, but one reason which made acquiescence easier was the knowledge that the burden fell on all equally.

With a material reduction in wages and in cost of materials, there will be popular demands for reductions in fare. Railways should be as interested in reducing the cost of living as other industries, and doubtless there may be places where reductions in the basic fare will actually gain for the railways an increase in both gross and net, but modifications of rates of fare which will reduce the net receipts of the companies are not warranted until the credit of the railways is restored and they have an opportunity to carry out deferred maintenance and build up some surplus. Nevertheless, it is not premature to consider the ways in which a reduction in fare might best be made when the time comes to put them in force.

It is to be hoped that the method used when the rates were increased will not be followed when the rates are reduced, that is to say, that there will be a horizontal reduction, unless the conditions are such as to make such a step the best possible solution of the problem. Usually this will not be the case. On most systems the fare limits are an inheritance from the ordinances of early days or from ancient franchises, and it is obvious that they are not the best which can now be drawn. This, then, is the time when each management ought to be considering seriously what fare system is best adapted to its particular property. Then when the time comes that reductions in fare are made, these reductions can be such as to bring about a logical fare system.

Such a system need not, by any means, be the same in every city. Thus, with a system like that in Boston with an inner area provided with expensive subways and surrounded by separate communities furnished with surface traction only, a reduction in fare for a local community ride may be the most logical plan to follow when a reduction is made. On the other hand, in a city where all cars radiate from a central point, as in Cleveland, it may be that the reduction should first be made in a central zone as a means of building up short-haul traffic. In still another city, the most desirable plan might be to expand the central unit fare zone in some or all directions or to correct glaring inconsistencies in the fare limits where there is more than one zone. In another case, where all the fare limits seem to be consistently arranged, they can remain the same, but a reduced rate ticket or weekly pass can be installed. In other localities, the introduction of a basic fare for the shortest ride, with some means of charging more for the longer ride, such as pay-enter for the first part of the ride and pay-leave for the latter part, may be the most fitting plan.

In fact, there is a multitude of ways of making reductions and no set rule can be laid down. But this at least can be said. The present is an excellent time for the study of this question of straightening out inconsistencies and discriminations in fare limits. Most managers know where these points are on their own systems. Reforms of this kind can probably be made more easily at a time of general fare reduction than at any other time and much more easily than when fares are increased.

### A Mile a Day When You Have Your Way

THE article on municipal track construction at Detroit, in this issue, serves to bring out the salient feature of the job, viz.: the large amount of track completed daily. The task of constructing a mile of paved track a day in paved city streets is one of some magnitude, especially when it is noted that the existing asphalt pavement must be torn up. To a large extent the work is a problem involving the utmost possible use of machinery, and the Detroit municipal engineers have assembled a plant which has enabled them to build track on a record-making scale. To a certain extent, also, the type of track as laid this year is of some assistance, since surfacing and lining are at a minimum where the type of steel ties selected is installed, while the "compressed concrete" or Hassam pavement may readily be constructed in a wholesale manner.

Another and essential factor of the speed at which the work is being carried on is the control which the city has over the streets. Probably no private enterprise would be permitted to open streets for such long distances, much less to open them practically over their entire width between curbs or to block entrances to homes and business houses at will. In some instances the only access to private property on the Detroit work has been by way of the sidewalks, and these have been used by automobiles and delivery wagons for block after block. The engineer for any private company who even suggested such a construction procedure doubtless would be forcibly ejected from his home town.

The Detroit work is notable for the adherence to the standards and recommendations of the American Electric Railway Engineering Association in such matters as rails and drainage provisions. Especial attention has been given to the latter. It should not be understood from this that the Engineering Association has recommended the rigid type of construction which has been adopted for the work done this year. Neither has the association recommended the use of the concrete pavement.

Another feature of the work is the adoption of the metallic electrode type of seam-weld rail joints as standard. In view of the discussion which seam-weld joints are receiving at the hands of track engineers, it will be worth while to watch the performance of the Detroit installation because its extent is sufficient to give the joint an ideal service test. In fact, the entire track installation should afford opportunities for study of the performance of a type of track construction which constantly has been gaining headway. The attention paid to the return circuit is to be marked because exceptional steps have been taken to assure a return of large capacity and one which cannot readily be disrupted.

The entire enterprise gives evidence of careful preliminary study in an attempt to build tracks which will stand up under the poor soil conditions for which Detroit is noted.

### Store Door Delivery by Railway and Truck Co-operation

THERE have been many proponents of store door delivery as a means of reducing total transportation costs and of speeding up service, but little actual progress has been made in putting the idea into practice. The opponents or doubters of such a plan should be given food for thought, at least, by the experience in Chicago, related in this issue.

That an increase in rate equal to the delivery charge of independent trucking concerns is not used is to be expected. On an independent basis, then, the delivery will not pay. But that very fact is a part of the reason for increased business. More important, however, is the idea of the service given. It is service which the railway has to sell to its freight customers, and the fact that the customers appreciate this new service in Chicago is attested, according to the data, by so large an increase in volume that the total profits have been favorably augmented.

An articulation of various transporting agencies is a much-needed development today, and the success attending the intelligent use and co-ordination of motor trucks by an electric railway management should encourage others to adopt similar programs.

It is good business for the railway, for the truck and for the public.

### "In Business as a Conductor," Not "Working for the Railway Company"

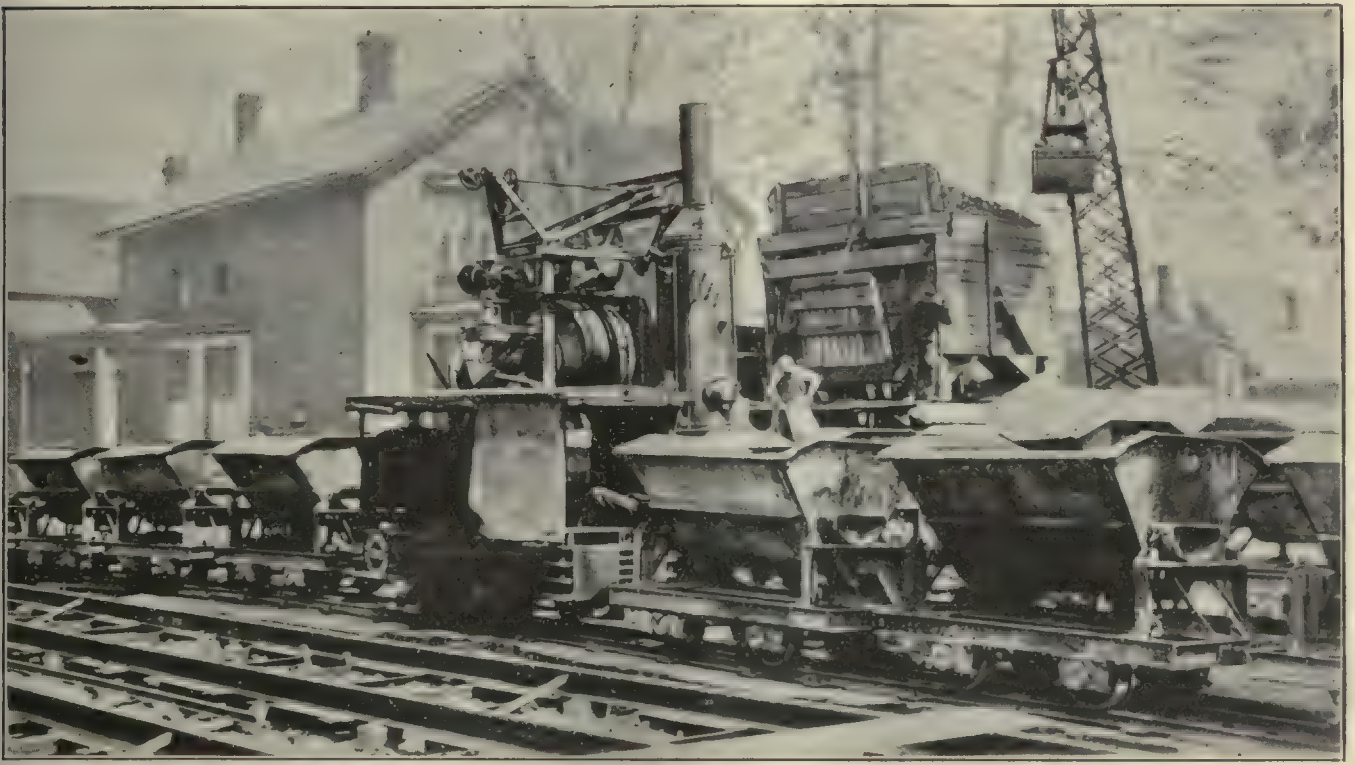
MAY NOT the first aim of all employee training and much organization and personnel work be epitomized in the statement that what is being attempted is to put each employee "In business as a railway man" rather than merely "working for the company"?

The real end desired is that the employee have a knowledge of the business; that he understand something of costs and revenue; that he realize that profits, including his own wages, must be earned and are obtainable only from the difference between revenue and expense; that he is a producer and a salesman—one of a large group all in one kind of business, mutually helpful and organized for greatest efficiency, and that he is "in business as a railway man" as much as the general manager, only in a different capacity.

It seems worth while to suggest this phrase, which really carries its own significance, as a motto or slogan to have in mind in dealing with employees. When every employee feels himself "in business" in his particular job, rather than selling his time, "working for the company," many problems are automatically solved.

# A Mile of Paved Track a Day

**Eighty-two Miles of Track to Be Built by Detroit Municipal Railway This Summer—Rigid Type Construction, with Heavy Plain Girder Rail, Seam-Welded Joints and Steel Ties, Is Used—Unusual Methods Employed to Expedite Construction Program**



CONCRETE MIXING PLANT AND TRAIN USED IN DISTRIBUTING 1,000-FT. EITHER WAY

WHETHER the city of Detroit is in earnest about going into the street railway business, the reader may judge for himself after learning from what follows of the magnitude and nature of the construction work now going on there. Besides those franchiseless Detroit United Railway lines which the city plans to add to its system by purchase this year, it is expected that 82 miles of single-track equivalent line will be completed before the winter sets in, so that by the end of 1921 the city may have a railway system of some importance. The construction is soon to be carried on at the rate of a mile of single track a working day. Already the scale of work has reached a magnitude nearing this schedule. The outstanding features are the extensive use of labor-saving devices, the adherence to American Electric Railway Association standards, the permanence of the construction and the ends to which the officials have gone to secure good drainage and good negative return circuit.

During the working week from May 2 to May 7 27,676 cu.ft. of trackway excavation was made, 11,496 ft. of rail laid and 12,117 ft. of concreting and paving done. On one of these days 360 truckloads of excavation of 6 and 7 cu.yd. each were hauled from various locations to the lower end of Belle Isle and dumped to fill in and enlarge the island. Up to May 7 the work completed this season includes 111,823 cu.ft. of trackway excavation, 59,133 ft. of rail laid and 27,250 ft. of concreting and paving. Forty to fifty carloads of materials of all kinds are being received daily.

The construction equipment purchased includes, among other things, twelve Erie steam shovels for excavating the trackway and breaking up existing pavement, six Erie cranes for handling aggregate at the mixer plants and in the storage yard, three Rex and three Lakewood 14-cu.ft. concrete mixers, ninety Lakewood three-bucket cars, six 4-ton Burton kerosene locomotives for pulling the concrete trains, 4 miles of industrial track, two tractors for snaking rail, two Winthrop Truck Company tractor earth-boring machines and pole setters, twelve Wilson plastic-arc, two-electrode welding machines, and other labor-saving devices. For hauling excavated earth and transporting the various materials to the job 200 motor trucks are being rented.

The total number of employees is 1,800, of whom the great majority are engaged as construction forces. All work is being done by the railway department itself rather than on contract. The trackwork is being done under the direction of H. P. Hevenor, who is retained as consulting and construction engineer, with W. R. Dunham, Jr., formerly engineer of way the Connecticut Company, as principal assistant. The overhead construction, described in an article to follow, and the track bonding and welding are being done under the direction of H. M. Gould, electrical engineer and formerly electrical and signal engineer of the Connecticut Company.

### PRESENT STATUS OF DETROIT SITUATION

These last few paragraphs will give an idea of the extent of the railway construction activities of the city now in progress. A comprehensive understanding

## Aggressive Tactics Used in Excavating for and Laying the Track

1. Machine used for breaking up paving for track excavation.

2. Appearance of warm asphalt after breaking up. Note chiseled line marking edge of excavation. In background asphalt has been removed for reclaiming and materials stored along trackway for new construction.

3. A better example of how the breaker leaves the paving.

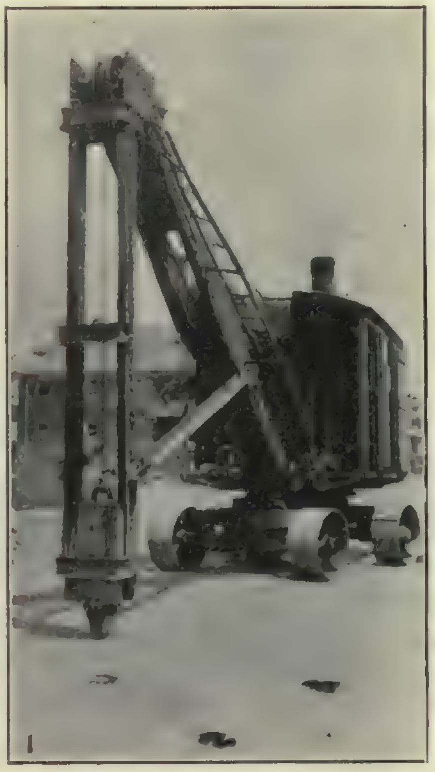
4. Steam shovel digging excavation for track and loading paving and earth into motor trucks.

5. The heavy clay soil encountered necessitates special drainage provision.

6. Ordinary field tile are used for drainage and the trench filled in with broken slag.

7. A layer of slag is spread over the track trench and rolled.

8. Rails and ties are assembled and blocked and wedged to grade and alignment.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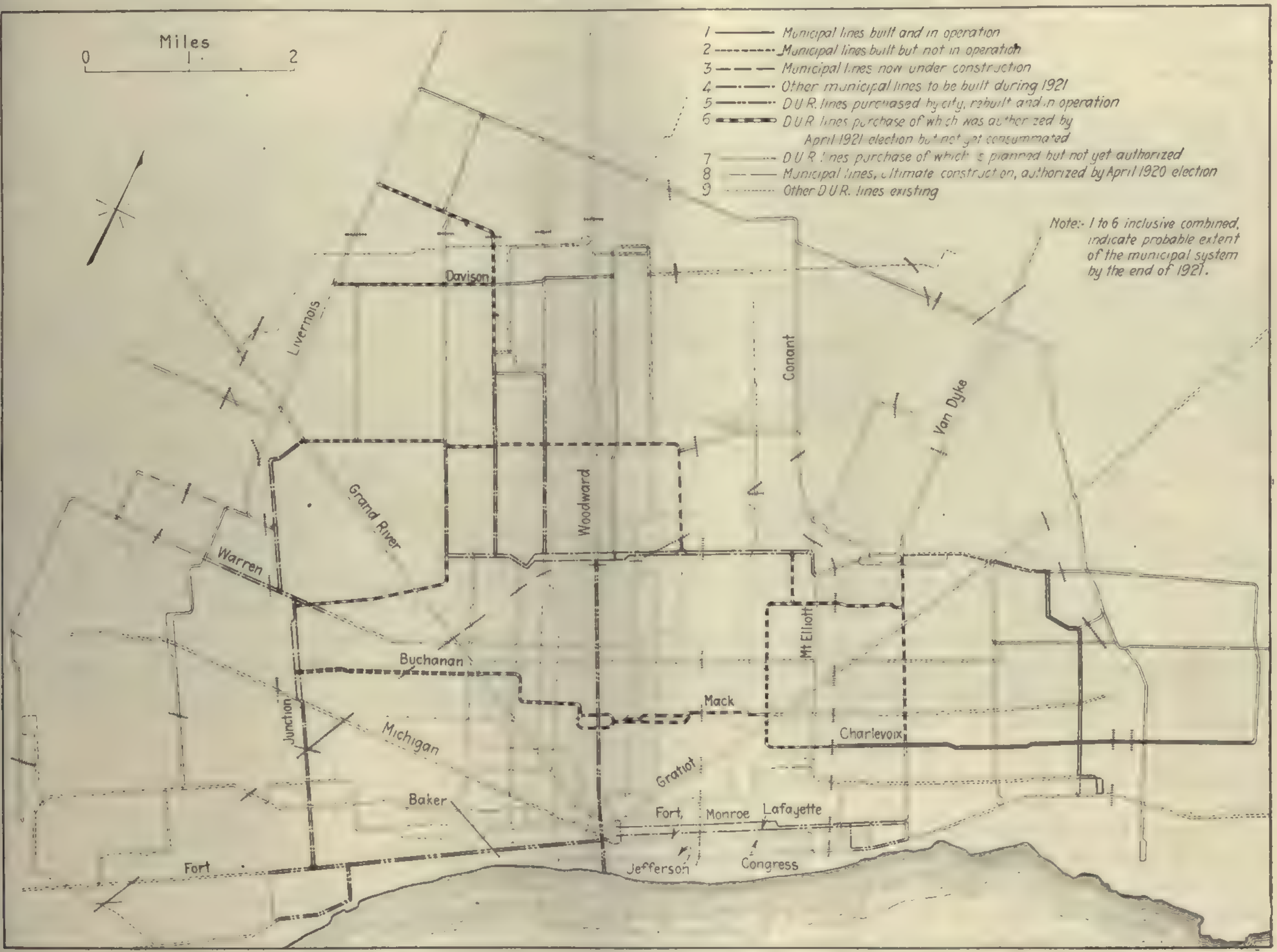
of the present status of the whole traction situation in Detroit can best be gained from a study of the maps especially prepared for this purpose and reproduced herewith. The map on page 124 shows the franchise situation of the Detroit United Railway as understood by the city authorities. The lines are divided into three classes: Those on which the franchises have several years to run before expiration; those lines being operated without franchises, and those on which the franchises have expired and operation is continued on a day-to-day agreement. The expiration of a franchise, of course, places the city in a position of advantage in negotiating piecemeal purchases.

The map below shows the municipal lines built and in operation; the lines built but not being operated; the lines now under construction; the additional lines to be constructed this year; those D. U. R. lines already purchased; those D. U. R. lines the purchase of which has been authorized; those D. U. R. lines which the city plans later to purchase though the bonds are not yet authorized, and, finally, the existing D. U. R. lines and the ultimate municipal lines, construction of which was authorized at the April, 1920, election. By taking the first six groups together, these lines being indicated on the map by the several heavy-line legends, an idea may be gained of what the municipal system will comprise by the end of 1921 if present intentions are carried out, and the relation of this to the D. U. R. system and to the proposed further city construction.

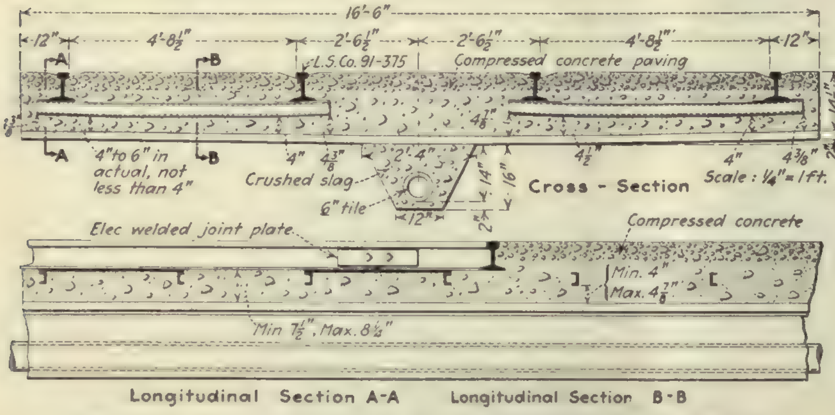
Last year the city built eighteen of the 67.1 miles of track planned as the first year's work. The uncompleted remainder, added to the lines planned for construction in 1921 (33.65 miles), gives the total of 82.75 miles to be built this year in order to catch up with the original promises made to the voters. By the end of 1921, if the present schedule is accomplished, the city will have constructed 100.75 miles of single track. In addition, it will have acquired by purchase roughly 28 miles, making a total system by the end of 1921 comprising in the neighborhood of 130 miles. At the time of this writing plans had been nearly completed for a new shop capable of handling 500 cars, a new carhouse and open storage for 200 cars and a large office building, all of which are to be built this summer. Twenty-five cars are in operation and 100 more on order.


Miles
0
1
2
1 Municipal lines built and in operation
2 Municipal lines built but not in operation
3 Municipal lines now under construction
4 Other municipal lines to be built during 1921
5 D.U.R. lines purchased by city, rebuilt and in operation
6 D.U.R. lines purchase of which was authorized by April 1921 election but not yet consummated
7 D.U.R. lines purchase of which is planned but not yet authorized
8 Municipal lines, ultimate construction, authorized by April 1920 election
9 Other D.U.R. lines existing
Note:- 1 to 6 inclusive combined, indicate probable extent of the municipal system by the end of 1921.
Davison
Livernois
Conant
Van Dyke
Grand River
Woodward
Warren
Mt. Elliott
Buchanan
Mack
Junction
Michigan
Charlevoix
Gratiot
Baker
Fort
Monroe
Lafayette
Fort
Jefferson
Congress

THIS MAP WAS DRAFTED BY THE MUNICIPAL RAILWAY AUTHORITIES TO SHOW THE CONDITION OF THEIR LINES IN ABOUT MAY OF THIS YEAR WITH THE PRIVATE LINES WHICH THE CITY HOPED TO TAKE OVER

Of the first 18 miles of track built in 1920 two intersecting lines on Charlevoix and St. Jean Streets, as seen on the map and comprising about 13 miles of single track, are being operated in a district not otherwise served, in which there are several important factories and scattered residences. During six hours a day twenty-two cars are operated to give rush-hour service and eleven cars all day. J. S. Goodwin, general manager, formerly Bridgeport manager for the Connecticut Company, reports that the earnings of these lines under conditions obviously unfavorable with only a piece of a system, are just about breaking even with expenses now.

During 1920 the track construction was done by contract. The type of construction employed then is somewhat similar to the standard of the D. U. R. This included a trench 22 in. deep in which a separate 8-in. slab of 1:3:5 concrete was poured under each track and permitted to set. Over this a 1-in. layer of 1:4 dry mix of sand and cement was placed and the track assembled on top of this and concreted in. This upper pouring of concrete was brought up to the level of the rails and floated and brushed to form the paving. Wood ties, 6 in. x 10 in. x 6 ft. 8 in., and 91-lb. 7-in. standard A.E.R.A. plain girder (or high T) rail were used, the joints being electrically welded. Steel ties were substituted for the wood ties on 22,600 ft. of double track built last year on Buchanan Street.



Sectional Drawings of Track Under Construction by the Detroit Municipal System on June 1

### Type of Construction Now Being Used

Beginning this year, the department of street railways decided to do its own construction work and to adopt a monolithic type of rigid track construction, employing International steel twin ties altogether, except under special work. By virtue of this change the depth of trench required was reduced to 17½ in. and, according to Mr. Goodwin, $30,000 per mile saved on the cost of construction as compared to the cost of the type of construction used last year embodying wood ties.

This new type of construction consists first of 2 in. of rolled slag on the bottom of the trench, with a 1:2:4 mix of concrete poured from the slag up over the ties and base of the rails. After this has hardened, the remainder of the trench up to the level of the rails is filled in with 2½ to 3 in. crushed Wisconsin granite. This is rolled and then filled in with 1:2 grout and rolled again, forming what is termed "compressed concrete pavement." The rail used is either A.E.R.A. 7-in. 91 or 93-lb. plain girder or A. R. A. (which is also a standard of A.E.R.A.) 100-lb. 6-in. standard section rail, both sections being supplied by the Lorain Steel Company. The 93-lb. rail is identical with the 91-lb. except that the thickness of the web just beneath the rail head has been increased to ⅝ in., tapering to the standard thickness of rail web, 7/16 in., to a point between the rail head and the top of the bolt hole. The heavier section is used on those streets on which greatest density of traffic is expected, and it not only reduces the amount of concrete required by a depth of 1 in. but the price per ton is also less. The 100-lb. rail comes in 66-ft. lengths, while the 91 and 93-lb. sections come in 60-ft. lengths.

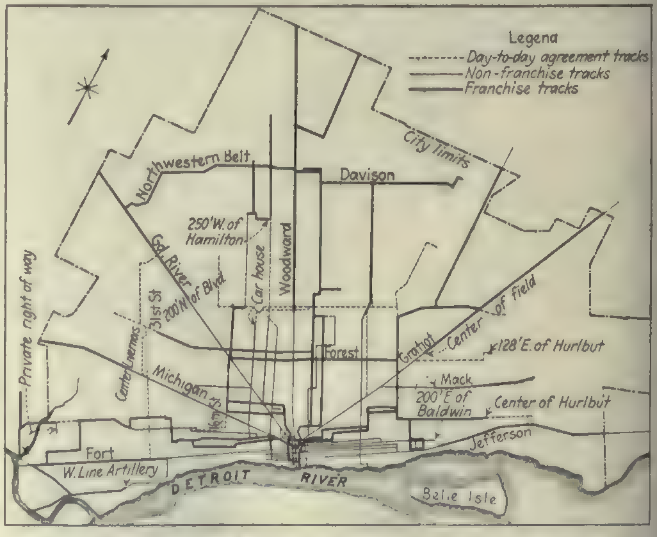
The steel ties are spaced 5 ft. 6 in. average centers and have the ends bent upward to give a cant of 1 to 25, thus providing for an inward tilting of the rails by the same amount.

The rail joints are made by using two 20-in. x ¾-in. plates which are held in place by two 1-in. bolts and electrically welded along the top and bottom. The head and nut of each of the bolts are welded to the rail and the nut to the bolt. This welding is done by the short arc or metallic electrode process, using Wilson Welder & Metals Company two-arc, gasoline engine-driven welding machines. This welding work will be treated more fully later on.

### Construction Methods and Engineering

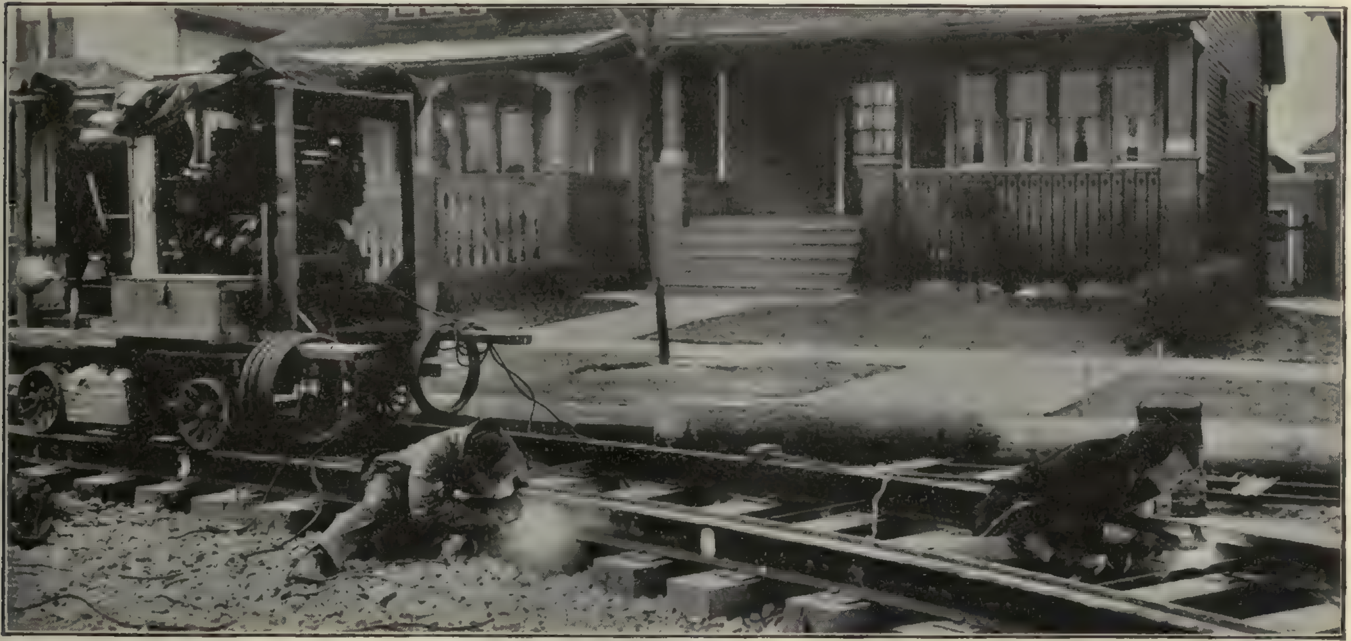
Where a new street-car line is to be constructed on a street already paved, the first operation is to cut a line with hand chisel and sledges to mark the side lines of the track excavation. A pavement breaker consisting of an Erie steam shovel equipped with guides and a 2,000-lb. weight, which is raised and dropped, is then used to break and shatter the asphalt and concrete foundation. If the asphalt surface is good, it is removed and reclaimed by the Department of Public Works. This breaker and the manner in which it shatters the pavement are shown in the accompanying pictures.

The next step is the use of a ¾-yd. Erie steam shovel to dig up the broken concrete and earth and dump it into motor trucks for removal. After this is done, a drainage trench 16 in. deep is dug by hand along the center of the trackway and common 6-in. field tile installed to insure thorough drainage underneath the track structure. The problem of drainage is particularly severe in Detroit on account of the heavy clay soil which offers practically no natural drainage. Hence unless provision is made for carrying away any accumulation of water, the clay soil and extremely flat topography result in a working of the entire track structure on a watery bed, under traffic conditions, producing a rapid deterioration. Hence a great effort has been



Present Franchise Status of the D. U. R. City Lines as Understood by the Detroit Authorities made to seal the track from above, to provide good surface drainage, and to drain it thoroughly from below. It is considered that if this drainage problem is solved, the most difficult phase of track construction in Detroit is mastered. An accompanying picture shows very clearly the nature of the subsoil on which the track structure must be placed. Another paragraph dealing with surface drainage appears later in this article.

With the drainage tile in place, the trench is filled with ½-in to ¾-in. broken slag and then a 2-in. layer of slag (or cinders when slag cannot be secured) spread over the entire track trench and compressed with an 8-ton roller. The steel ties and rails are then assembled and blocked up approximately to grade by means of concrete blocks made for this special purpose during the past winter. An effort is made to bring the rails as near to grade and alignment as possible before welding, but it is necessary to make the final adjustment after the welding has been completed, and just prior to pouring the concrete foundation.



GASOLINE ENGINE-DRIVEN WELDING MACHINE USED

The welding work is usually carried on by placing a Wilson welding machine on each track and assigning an operator to each rail. The use of gasoline engine-driven generators was necessitated because of the absence of power in many locations and because the overhead construction has for the most part been erected after completion of the trackwork. The joint plates are welded to the head and base of the rail along their entire length and the bolt heads and nuts welded as already mentioned. The operator also welds the two rails together at the base where the two ends abut, and then welds the base of the rail to the plate of the steel tie. The rail joints are staggered and both sides of the base of the rail opposite a joint are also welded to the tie plate. This is done on both sides of the rail. Also, beginning at the joint, every other tie is welded to the base of the rail and on one tie per rail length located midway between joints the two tie plates are each spot welded at the four corners to the cross channels (making eight spot welds) as well as to both sides of the bases of the two rails. This insures a perfect cross bond between rails and makes it practically an impossibility for an open circuit to occur in the negative return. If every joint were broken down there would still be an electrical by-pass around the joints through the intermediate welded ties and opposite rail.

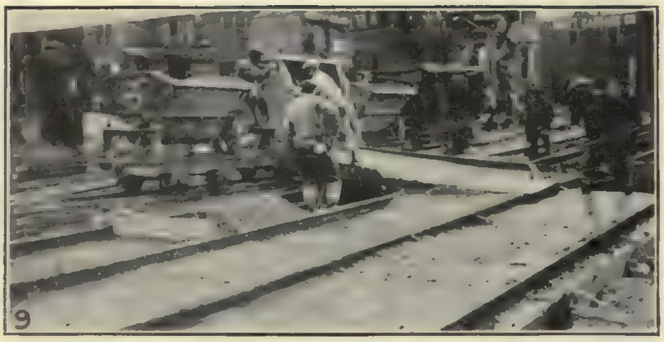
To accomplish this extensive welding work twelve Wilson welding machines were purchased. Even with this number of machines it is necessary at times to work two shifts a day in order to keep ahead of the concreters. This is avoided if possible, however, as the noise of the engine and the flashing of the arc annoy the residents at night. Some little difficulty was had in training welders to handle this plastic arc welding. Most of the experienced welders were accustomed to other machines using a longer arc. Whenever an arc over ⅛ in. long is drawn with this machine the current is automatically cut off. Hence except for those men who had previously had experience in handling the short arc the best results were obtained by breaking in entirely inexperienced men. These Wilson welders have a capacity of 300 amp. at 35 volts using approximately 20 volts at the arc. Under the very heavy service to which they have been subjected they have worked out very well. Two Ohio Brass Company resistance-type welders have also been used at locations where current was available. All joints are finally finished off with a reciprocating grinder after the track is entirely completed.

### CONCRETING METHODS AND EQUIPMENT

After the track is assembled and welded and wedged and blocked to grade and alignment the concrete for the base is poured as a rather large scale operation. The concrete is prepared at a central mixing plant and distributed 1,000 ft. either way by means of side dump cars which are hauled over a narrow-gage track by means of kerosene engine locomotives supplied by the Burton Engine & Machine Company, Cincinnati. After a 2,000-ft. stretch of track is concreted the mixing plant is moved to the middle point of the next 2,000-ft. section and again erected.

These mixing plants are usually located in a street intersecting the line under construction. The concrete materials are brought by truck and unloaded in the street adjacent to the plant. From here they are picked

# Successive Stages of Track Construction in Detroit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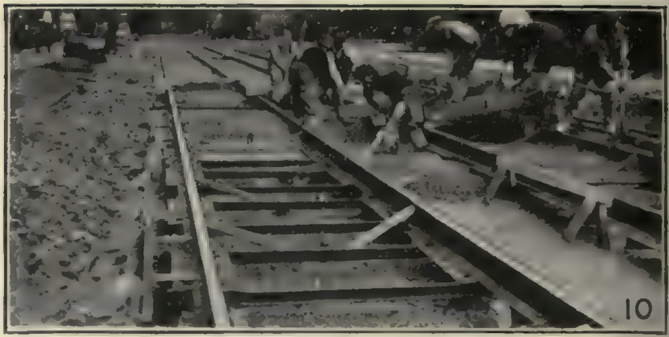
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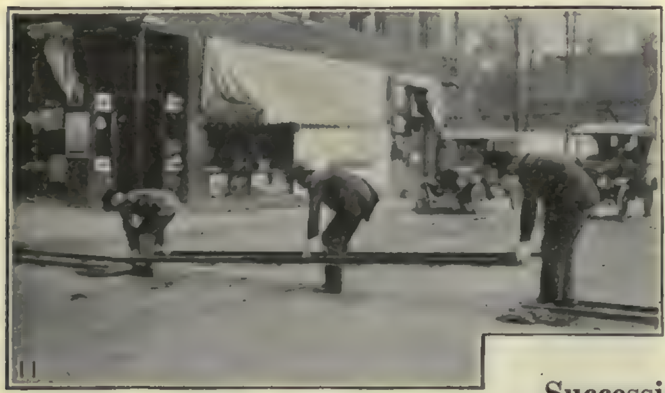
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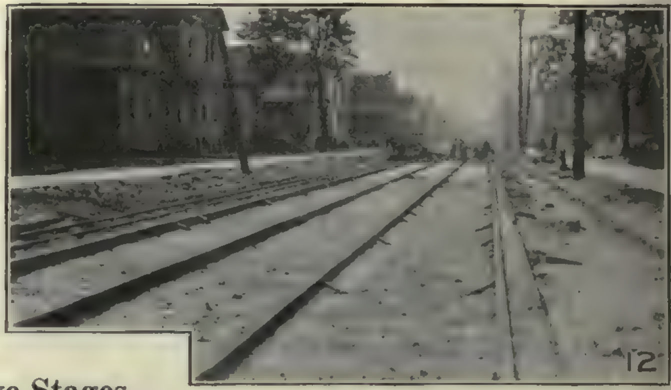
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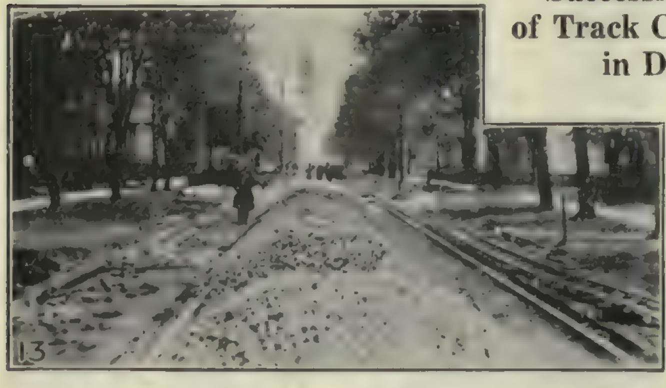
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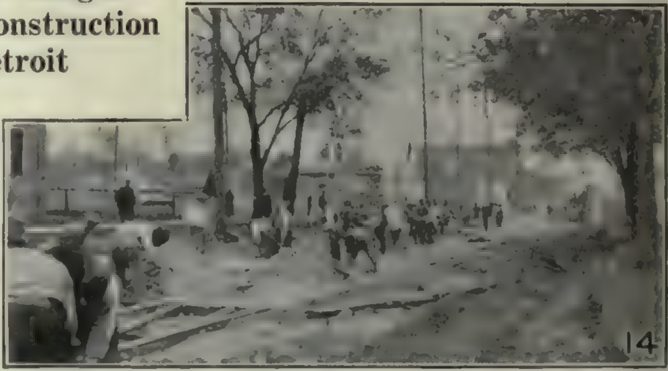
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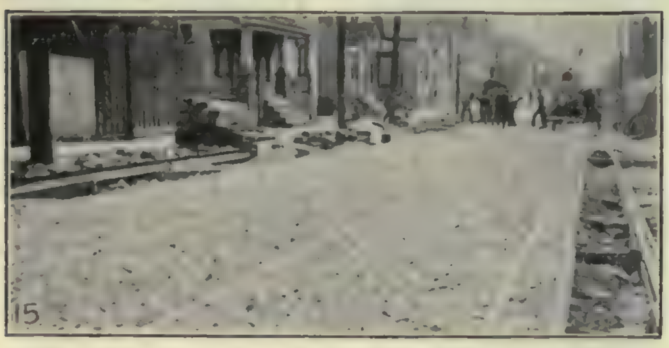
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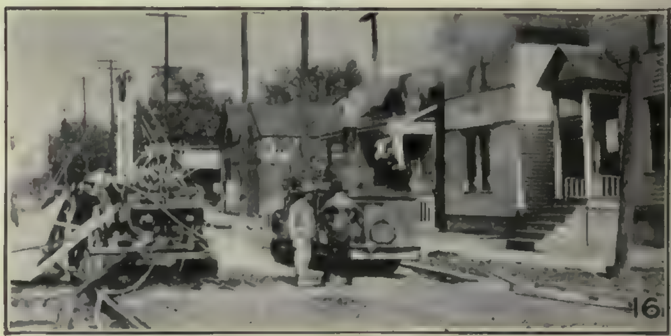
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9. Dumping concrete from cars into pan and pouring to make track foundation.

10. Another pouring scene showing how care is taken to get complete bearing under ties and rails.

11. "Lift bridge" used for operating concrete trains across existing car tracks.

12. Concrete foundation completed and surface roughed up to secure binding with paving concrete.

13. Crushed granite is dumped by truck loads on the track after the base has hardened.

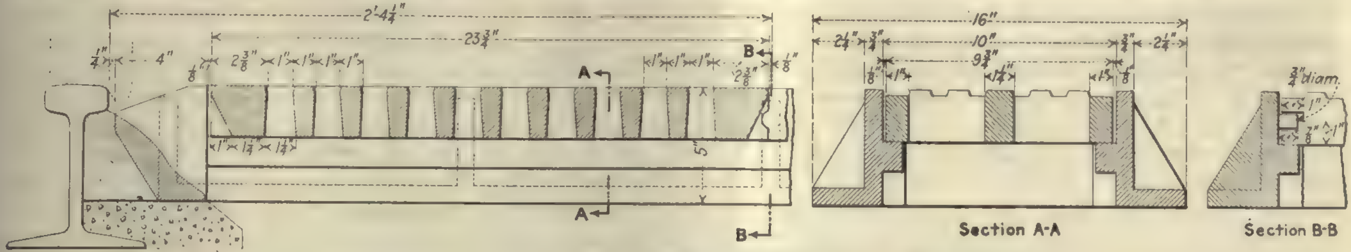
14. Distributing the granite to a level slightly above the rail ready for rolling.

15. Appearance of track after spreading the layer of granite and before rolling.

16. Grouting machine. The stone is rolled both before and after grouting to form "compressed concrete paving."

17. After final rolling, hand-tampers remove any irregularities and smooth up the flangeway.

18. The final operation is to distribute surplus grout and cross-brush the surface.



CROSS-SECTIONAL VIEWS OF TRACK DRAIN, SHOWING COVER CONSTRUCTION

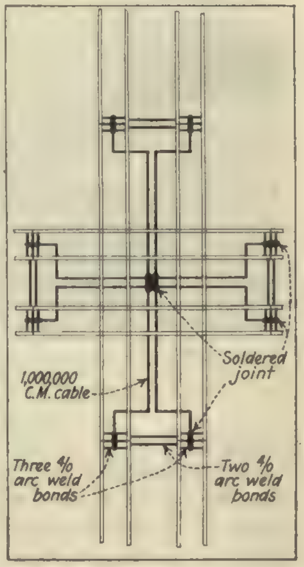
up by an Erie crane and clamshell bucket and dumped into an elevated bin from which they are discharged by gravity into the charging skip of the mixer. The cement is emptied from bags by hand into this skip. When the charge is made up the chute from the overhead bin is raised so that the skip may be elevated and the materials discharged into the 14-cu.ft. steam-driven mixer. The mixer discharges directly into the narrow-gage dump cars. The aggregate used is made up of 25 per cent ¾-in. to 2½-in. slag to neutralize the excessive amount of sand in the local gravel.

One locomotive and three five-car trains serve each mixer. Three trains are required in order to facilitate the movement of the cars, the plan followed requiring only a single track with a short double-end siding at the mixer plant. Five cars stand idle on this side track while the locomotive is taking five other cars to the pouring point and return and the third five cars are being filled at the mixer. The scheme is this: The locomotive pushes the loaded train to the pouring point and pulls it back after the cars are dumped. When it returns it takes the siding, couples with the five idle cars and uncouples from the five cars which it has just brought back. The five cars just picked up are then pushed through the opposite end of the siding and then pulled back on the track immediately in front of the mixer. The locomotive is then uncoupled from these empty cars and coupled to the five loaded cars and the cycle is repeated. While the engine is gone the five cars on the mixer track are moved up one at a time by hand and filled, moved on beyond the mixer and coupled up ready for handling by the locomotive. It takes a lot of words to tell about this but the operation is very simple and quick, the locomotives coupling and uncoupling practically without stopping except to reverse direction.

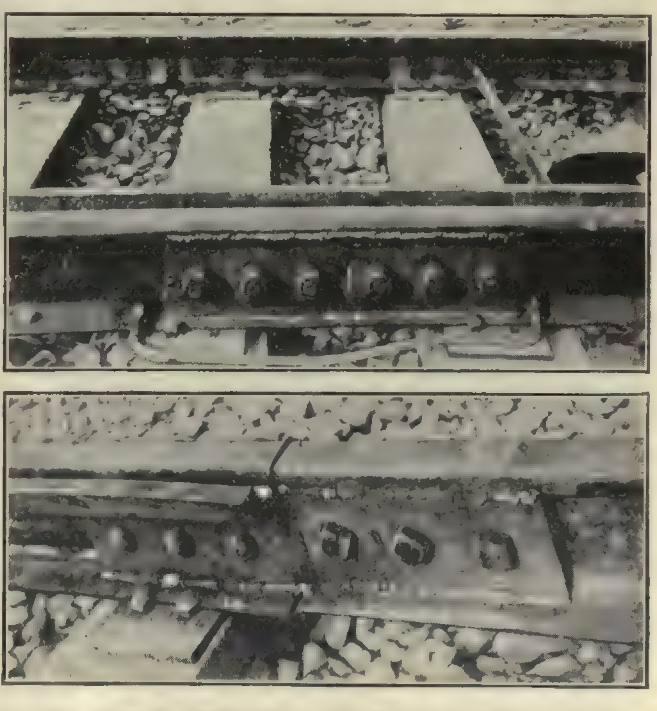
At the pouring point the cars are dumped in a large steel pan from which the concrete is shoveled and hoed into the track and shoveled and tamped underneath ties, and underneath rails between ties, so that a complete bearing is secured. As the concrete is carried up 2 in. over the base of the rail, embedding and gripping the ties and base of the rail, the construction is spoken of as being monolithic, though the paving is put on as a separate layer. An effort is made to secure a good union between the paving layer and the base concrete by roughing up the surface of the latter before it sets.

### BUILDING THE COMPRESSED CONCRETE PAVING

After the base is poured, the concrete is allowed to set three or four days until trucks can be driven over it. Crushed Wisconsin granite in 2½ to 3-in. sizes is then dumped on the track by truck loads so distributed as to require minimum handling. From these piles the granite is spread with forks and this is the only part of the work where a large number of men are seen to be engaged in one operation. The stone is spread over the trackway, level with the top of the rails or slightly above, and is then rolled with an 8-ton roller, which just fits in between the rails, until the pieces of stone are thoroughly welded together and a compact mass of stone obtained. A 1:2 grout is then poured into the stone, filling the joints until flush with the top. The roller is again applied, squeezing out all the air and securing a complete penetration. The rolling is continued until there ceases to be a wave of grout ahead of the roller, thus forming a granite-concrete pavement of extreme hardness and presumably having much of the resistance to wear that is characteristic of Wisconsin granite block paving. The grout mixer consists of a sheet-iron tank with straight sides and a curved bottom mounted on heavy steel wheels with the platform about three feet above the ground. A steel shaft to which mixing blades are fastened runs longitudinally through the tank. This shaft is rotated by a small gasoline motor which also operates a loading hopper. The grout



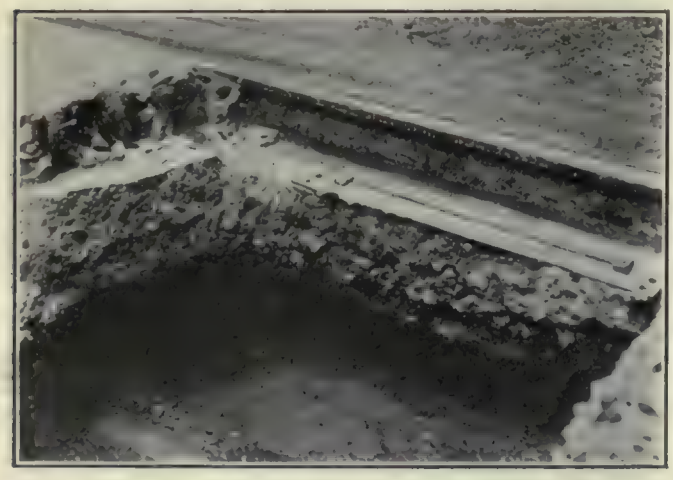
SKETCH OF BONDING AROUND SPECIAL WORK LAYOUT



AT TOP, TYPE OF MECHANICAL AND ELECTRICAL JOINTS USED IN TRACK SPECIAL WORK. AT BOTTOM, BOLTED AND WELDED COMPROMISE JOINTS BETWEEN SPECIAL WORK AND STANDARD SECTION is delivered from the bottom of the tank through two galvanized iron telescopic swinging spouts, which terminate in cylindrical perforated heads about 12 in. in diameter. These spout heads are moved over the work to distribute the grout equally. One of these units will lay about 900 sq.yd. of grouted cement, 6 in. in depth, per eight-hour day.

A CRANE AND CLAMSHELL BUCKET AND OVERHEAD BUNKER GREATLY FACILITATE HANDLING OF MATERIALS AND LOADING TRUCKS AT STORAGE YARD

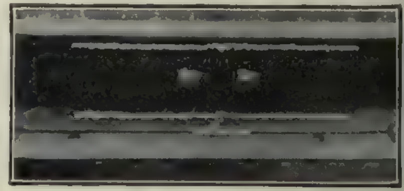
Just before the grout rolling is begun provision is made for forming the flangeway along each rail by laying down, adjacent to the rail, flange forms consisting of a 4-in. steel strip on top, to which is riveted a 3-in. strip underneath, with a wood filler between the two in such manner as to give a triangular cross-section. As these forms are laid in place the base of the triangle is adjacent to the rail and the hypotenuse down. As the grouted stone is rolled these forms are pressed into the structure, forming a flangeway in the concrete. They are removed after the rolling has been completed.


TEXTURE OF DETROIT COMPRESSED CONCRETE PAVING AND FOUNDATION CONCRETE AS REVEALED BY TEST OPENING

A group of men follow along after the rolling is completed and tamp down any irregularities in the surface and trim up the flangeway. These men are followed by another group equipped with brooms who distribute any surplus grout and complete the paving surface with a cross-brushed finish. This type of paving is called "compressed concrete paving" in Detroit, but the more common name for it is stone paving. It is being used quite commonly in highway construction and has been used to a limited extent by New England traction companies. The amount of stone used with this compressed process is from 8 to 10 per cent more than in ordinary concrete. The advantages claimed for this particular type of concrete pavement are as follows: It is more dense and homogeneous than ordinary mixed concrete. It is free from pockets of sand and fine aggregate. As the stone is placed and then grouted, large-sized stone can be used so that all wear is directly on the stone instead of on the cement mortar and the pavement thus has greater resistance to abrasion, the mortar cementing the stone together. A smooth surface comparable with asphalt is obtained. This type of concrete pavement holds up better under traffic and is less likely to crack and chip than ordinary concrete. Excavations through it for underground structures are repaired in the same manner as in ordinary concrete pavement.

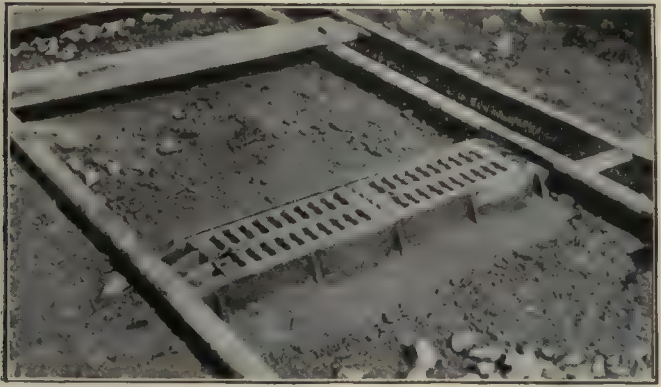
### SPECIAL WORK CONSTRUCTION AND BONDING

At all special work locations wood ties, tie plates and tie rods and granite block paving are being used, otherwise the construction is the same as on tangent track. The special work is of the manganese insert type using tadpole switches entirely, all special work being of Lorain manufacture. All joints in special work are made with six-bolt fishplates which are also welded along the top and bottom, including the compromise joints between the special work and standard section. The electrical circuit of these joints is further insured by the use of one No. 0000 arc-welded bond attached to the base of the rail on either side of the 26-in. joint plate. In close work where there is not room to attach this bond outside the fish plate a short U-bond is used instead and welded to the base of the rail. This extra bond is used as a safety measure, since the joint in a curve or other special work is more likely to break down than in tangent track, and the expense involved in doing this, when the welding machine is right there, is of small consequence as compared to the value of the extra surety of the negative circuit. Another reason given for the use of this extra bond is that by this means about the same electrical capacity is provided through the special work where wood ties are used as exists where the steel ties are used on tangent track. The nuts of every third tie rod used in special work and wherever wood ties are employed are spot welded to the rail and to the tie rod. On tangent track, a No. 0000 arc-weld cross bond between the two rails of each track is installed every 500 ft., or every 1,000 ft. in outlying sections. At the approach to guard rail curves two such cross bonds are installed and also two between tracks.


APPEARANCE OF COMPLETED JOINT AFTER WELDING

The thoroughness with which intersection special work layouts have been bonded is of particular interest. In addition to the complete bonding of the rail joints as noted above, the entire layout is shunted by an unusual amount of copper. For example, at a double-track intersection with a double track the two rails of each of the eight tracks approaching the intersection are bonded together with three No. 0000 standard copper arc-weld bonds. The inner rails of the two tracks at the four approaches are similarly bonded with two No. 0000 arc-welded bonds. The midpoint of the three bonds between the rails of each track is then connected to the similar cross bonds of the same track at the opposite side of the special work by a 1,000,000 circ.mil stranded bare copper cable, the connection being made with soldered joints which are painted with black insulating paint and wrapped. The entire cables and cross bonds are also painted. There are thus four of these 1,000,000 circ.mil cables, two in each direction, intersecting at the center of the special work layout, and they are all tied together at this point in a soldered joint. These cross cables are laid in the devil strip in a wood trough filled with a mixture of 75 per cent pitch and 25 per cent tar and a small amount of fine gravel. At outlying points the same system of bonding special work layouts is used except that the size of the cross cables is reduced. A sketch of this bonding scheme is reproduced herewith, from which an understanding of the scheme can be more quickly obtained than from the description. It makes it possible to lift out an entire layout without disturbing the return circuit.

Another interesting feature of the special work construction is the installation of a track switch box at every switch point, including the 2-in. galvanized iron pipe or conduit leading up an adjacent pole. These boxes are installed whether or not there is any expectation of installing an electric switch at this point, the theory being that to carry the investment on the box is a small expense compared to the cost of later tearing up the concrete paving to install a box, in case an electric switch were desired at that point. All these switch boxes are drained by tile connection to the sewer, so that there will not be any spattering of water when the switch is thrown.



AT TOP, A SPECIAL WORK LAYOUT GOING INTO PLACE. AT LEFT, TYPE OF TRACK DRAIN USED TO HANDLE SURFACE WATER. AT RIGHT, DRAINED SWITCHBOXES INSTALLED AT EVERY SWITCH POINT READY FOR FUTURE INSTALLATION OF MAGNETS

### SURFACE DRAINAGE

It will be apparent from what has already been said that the track is completely sealed against penetration of water through the structure. In addition to this means of keeping the water out, the surface drainage is made effective by the use of cross-drains extending from rail to rail and by virtue of the pavement grade established by the Department of Public Works to which the car tracks naturally conform. On account of the very flat topography of Detroit, the Public Works Department has established a substantial pitch from the center of every block toward the corners in either direction, providing for a very quick runoff. This presumably gives good drainage but results in a peculiarly wavy appearance of the car tracks as one looks any distance along a street. The cross drain has been substituted for the round type of drain used in the first track built, because it affords a drain of greater capacity and makes a smooth surface for vehicles to drive over. The particular cross drain used was designed by Mr. Dunham and the features of it are that it provides particularly well for draining the run of water in the flangeway and that it is equipped with a type of cover which cannot flop out of place. This latter feature is accomplished by dividing the cover into two halves, the inside end of each half being cast with a semi-circular groove at each side which fits around and under a round lug on the base casting. This inner end can therefore not fly upward when a truck wheel passes over the outer end or be lifted upward until the outer end has been raised slightly and pulled outwardly. A drawing of this track drain is reproduced herewith.

In addition to the labor-saving devices already mentioned, the facilities for handling materials in the storage yards are also of interest. For example, the loading of the crushed granite used in the paving is expedited by a crane and ¾-yd. clamshell bucket which picks up the stone from the storage pile or from cars run in on the adjacent track and dumps it into an elevated bin. These facilities are seen in an accompanying picture. This bin has sufficient capacity to load six motor trucks, each holding 6 to 7 cu.yd.

There are two outlets from the bottom of this and the trucks drive in between the supporting timbers and are loaded by gravity, two minutes to the truck. This bin has been built so that it can easily be taken down and transferred to other storage yards located nearer to other construction points. The crane travels along on planks and is, of course, used to unload stone from cars to storage pile as well as to keep the bin filled, and to handle other materials.

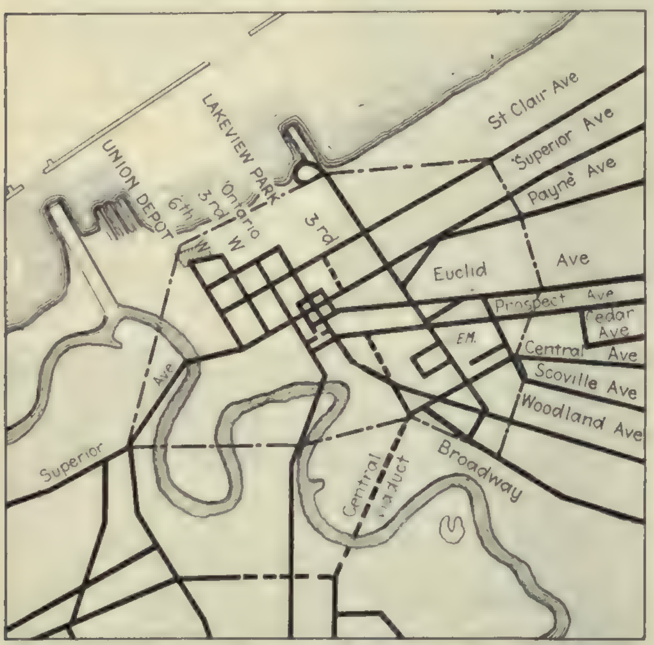
A second article on the new municipal system in Detroit and treating the overhead construction will be published in an early issue.

# Reduced Fare in Cleveland

### On July 10 the Cleveland Railway Began a Thirty-Day Experiment with a 2½-Cent Ticket Fare and 3-Cent Cash Fare for Downtown Riders

CLEVELAND is now in the midst of an experiment with its street railway system that may bring an answer to this question: "How much effect has a low rate of fare on the street car riding habit?" The experiment was begun on Sunday, July 10, when the Cleveland Railway put into operation a 3-cent cash or 2½-cent ticket rate of fare within a limited zone in the downtown section of the city.

The experiment was originated by the Cleveland Railway officials and Fielder Sanders, city street railway commissioner, and was authorized by the City Council for a thirty-day period because of a steady diminution in the number of car riders. Passenger traffic in Cleveland began to decrease almost immediately after Nov. 14 last year when the company put into effect the maximum rate of fare provided under the franchise, namely, 6 cents cash or nine tickets for 50 cents, with a 1-cent charge for a transfer and no rebate.



MAP OF CENTRAL PART OF CLEVELAND SHOWING 2½-CENT FARE ZONE

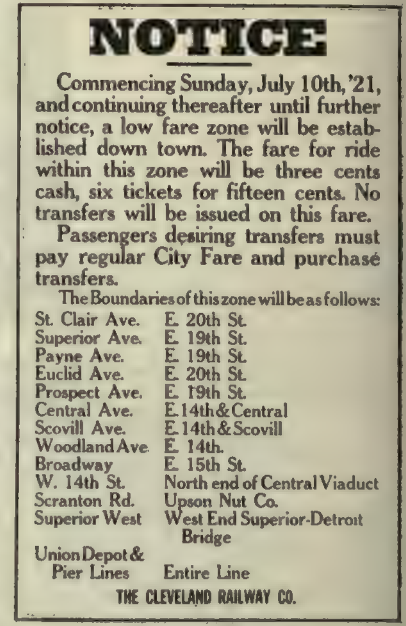
### OFFICIALS CANNOT ESTIMATE PERCENTAGE OF INCREASE IN PASSENGER TRAFFIC

The company's officers frankly admitted that they were unable to tell in advance the extent of the business which would be attracted by the reduced fare. "A low rate of fare has always been looked upon as a stimulus to street car traffic," said John J. Stanley, president of the company. "Whether it will prove such in this case remains to be seen, but we are always ready in Cleveland to try out any plan that promises increased service to our patrons when it doesn't mean increased expense, or to attempt anything that will bolster up the revenues of the company." Fielder Sanders, city street railway commissioner, said: "I am very hopeful that placing the cost of a ride in the downtown district as low as 2½ cents will bring back the riding habit, that it will increase to some extent the revenues of the company, that it will offer an increased convenience to a large number of car riders and that it will lessen the congestion on our sidewalks in the downtown district."

On Monday, July 11, the first business day during which the low fare zone was in actual operation, 8,710 passengers purchased the tickets which are in strips of six for 15 cents, while 8,216 others paid the 3-cent cash fare. The data for the next five days follow:

| Date | Number of 2½-Cent Ticket Purchasers | Number of 3-Cent Cash Fare Riders | Total |
|---|---|---|---|
| July 11 | 8,710 | 8,216 | 16,926 |
| July 12 | 10,145 | 8,499 | 18,644 |
| July 13 | 10,040 | 8,115 | 18,155 |
| July 14 | 11,104 | 7,645 | 18,749 |
| July 15 | 10,374 | 7,944 | 18,318 |

"These figures indicate the experiment is not meeting with the success that had been expected by those who were optimistic that it would stimulate the car riding habit in the downtown district," said Paul E. Wilson, assistant secretary of the Cleveland Railway. The Union Depot and Pier lines, which operate exclusively in the downtown district, have shown an increased number of riders since the low fare zone was established, but the loss in revenue for the company by reason of the payment of the 2½-cent ticket or 3-cent cash instead of 6-cent fare is more than offset in the increased number of riders. Cleveland is unusually well adapted for the low-fare zone experiment in the downtown section because all the cars have been operated on the pay-as-you-enter plan when bound toward the Public Square and on the pay-as-you-leave plan when outbound from the square. This has made it unnecessary to give identification slips or tickets for passengers entitled to the special low rate of fare. The only complication came in the operation of the Peter Witt front-entrance, center-exit type of car. This was cared for by using the entrance door for exit only in the downtown section—that is to say, the cars have been operated as center-entrance, front-exit cars.



**NOTICE**

Commencing Sunday, July 10th, '21, and continuing thereafter until further notice, a low fare zone will be established down town. The fare for ride within this zone will be three cents cash, six tickets for fifteen cents. No transfers will be issued on this fare.

Passengers desiring transfers must pay regular City Fare and purchase transfers.

The Boundaries of this zone will be as follows:

| | |
|---|---|
| St. Clair Ave. | E. 20th St. |
| Superior Ave. | E. 19th St. |
| Payne Ave. | E. 19th St. |
| Euclid Ave. | E. 20th St. |
| Prospect Ave. | E. 19th St. |
| Central Ave. | E. 14th & Central |
| Scovill Ave. | E. 14th & Scovill |
| Woodland Ave. | E. 14th. |
| Broadway | E. 15th St. |
| W. 14th St. | North end of Central Viaduct |
| Scranton Rd. | Upson Nut Co. |
| Superior West | West End Superior-Detroit Bridge |
| Union Depot & Pier Lines | Entire Line |

THE CLEVELAND RAILWAY CO.

POSTER USED IN CLEVELAND

The trainmen have been better instructed in arranging for the installation of the experiment than they have been for almost any other change ever effected in Cleveland. This has resulted in there being very little, if any, confusion and has also encouraged the use of the low-fare rate cars in the downtown section. One rule which has helped is that conductors are not obliged to give any change to a 3-cent rider who has no change smaller than a nickel. Such a passenger is obliged to drop the nickel in the fare box.

The following table, showing how the number of car riders has been continually decreasing since the middle of November last year, tells more graphically and forcibly than any words could one of the potent reasons for the installation of the low-fare zone:

| Month | Number of Car Riders | Per Cent Increase or Decrease Over Previous Year |
|---|---|---|
| 1920 | | |
| June | 37,807,197 | 13.9 |
| July | 38,865,614 | 21.1 |
| August | 38,623,226 | 10.3 |
| September | 37,317,656 | 9 |
| October | 38,726,694 | 6.7 |
| November | 36,241,205 | 2.9 |
| December | 36,824,277 | 2.2† |
| 1921 | | |
| January | 35,598,783 | 4.17† |
| February | 32,585,727 | 4.21† |
| March | 35,900,733 | 7.04† |
| April | 34,339,336 | 9.33† |
| May | 34,646,310 | 10.86† |
| June* | 33,500,000 | 13† |

* June, 1921, figures estimated. †Indicates decrease.

A map accompanying this article indicates the territory included in the low-fare zone. A copy of the bulletin posted in the cars is also reproduced.

It seems likely that unless the traffic increases materially within the next two weeks, the experiment will be discontinued at the end of the thirty-day test.

## Prizes for Accident Reduction

### Louisville Railway Gives Dinner and Entertainment to the Men at the Carhouse Having the Largest Number of Car-Miles Per Accident

THE two illustrations on this page show the result of a competition being conducted on the Louisville Railway in the interests of accident reduction. This competition began with a challenge from one of the carhouses of the company to all of the others to operate a greater number of car-miles per accident. This challenge came out about the time the Louisville Railway Safety Council was organized, and recognizing the value of that kind of competition the company offered as a prize a dinner to the winning carhouse.

The competition was started in April of this year, and Chestnut Street carhouse was the winner, operating an average of 3,960 car-miles per accident. The employees of this carhouse held their dinner on May 17. In May the employees of Highland carhouse won the contest, operating 4,700 miles per accident, and held their dinner on June 22. Chestnut Street carhouse won again during the month of June, operating 3,745 miles per accident, and held its dinner on July 19.

Although the function of the dinner is accident prevention, and that topic is touched upon by the speaker of the evening, the affair is primarily in the nature of a good time for the diners, with an evening of entertainment, all educational features and accident prevention propaganda being subordinated. The speaker is usually some one outside the company organization.

CHESTNUT STREET CARHOUSE WAS THE PRIZE WINNER IN APRIL

## Merchandising Transportation

### In This Article, the Third in the Series, the Author Discusses Service as Secured Through Department Heads and Records

BY W. H. BOYCE

General Manager Beaver Valley Traction Company

**SERVICE** *is not all dollars and cents. It is human. Cater to your car rider's mind—not alone his pocketbook.*

THE extent to which proper service adds to the sale of transportation is a large one, and proper service, as we view the matter, is service from each and every employee. In the carhouse it means proper equipment and careful, conscientious workmen, who must be trained to do their work properly, rather than to give an explanation to their superior officer later on as to why the work was improperly done. This will result in a decreased number of car failures and better service to the public.

Messrs. MARSHALL, Chief Dispatcher
MEYER, Master Mechanic
KELBAUGH, Barn Foreman
McDADE, Assistant Dispatcher
McDANEL, Assistant Dispatcher
ALLISON, Safety Engineer
HUME, Chief of Police
LOGAN, Night Receiver

I want better service for myself and for our public. Stop! Do some real hard thinking. Are all the men in your department doing their best to render better service, to which our traveling public is justly entitled? I am not unselfish in this, for better service will result in increased car riders. Increased car riders mean increased revenue. Increased revenue means that the possibility of a decrease in wages for all employees will be deferred. It also means additional modern equipment and appliances. Additional modern equipment and appliances should mean further increased and better service and consequently a further increase in revenue. I want you to bear in mind that an increase or decrease in revenue will surely affect your condition here.

W. H. BOYCE, G. M.

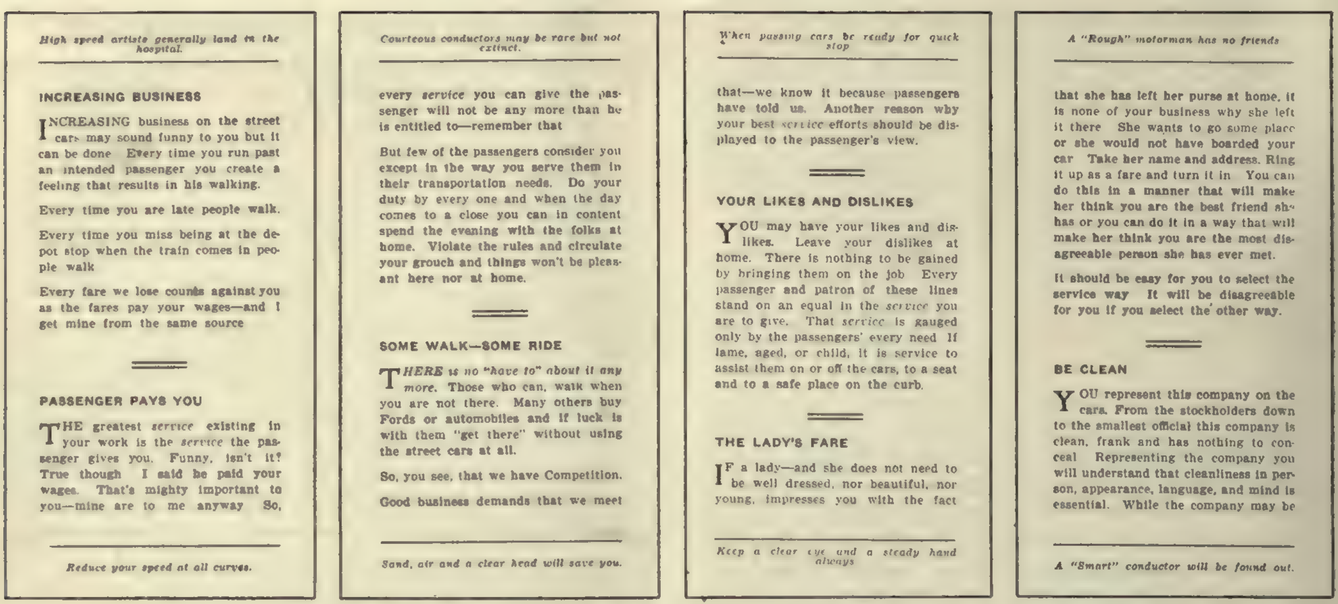
SAMPLE OF GENERAL NOTICE TO FOREMEN

Cars must be well maintained and have their seats comfortable and interior—as well as exterior—pleasing to the eye. It is just as essential that the trucks and electric equipment be in proper operating condition.

More frequent headways, with the same number of cars, may be obtained in numerous instances by eliminating lay-over time and shortening the running time.

A speed as high as is consistent with safe operation is very desirable, because today our patrons do want speed. If they cannot get it on the street cars they will get it from privately owned automobiles or jit-

HIGHLAND CARHOUSE MEN AT THEIR PRIZE DINNER, JUNE 22



*High speed artists generally land in the hospital.*

INCREASING BUSINESS

INCREASING business on the street cars may sound funny to you but it can be done Every time you run past an intended passenger you create a feeling that results in his walking.

Every time you are late people walk.

Every time you miss being at the depot stop when the train comes in people walk

Every fare we lose counts against you as the fares pay your wages—and I get mine from the same source

PASSENGER PAYS YOU

THE greatest *service* existing in your work is the *service* the passenger gives you. Funny, isn't it? True though I said he paid your wages. That's mighty important to you—mine are to me anyway So,

*Reduce your speed at all curves.*

---

*Courteous conductors may be rare but not extinct.*

every *service* you can give the passenger will not be any more than he is entitled to—remember that

But few of the passengers consider you except in the way you serve them in their transportation needs. Do your duty by every one and when the day comes to a close you can in content spend the evening with the folks at home. Violate the rules and circulate your grouch and things won't be pleasant here nor at home.

SOME WALK—SOME RIDE

*THERE is no "have to" about it any more.* Those who can, walk when you are not there. Many others buy Fords or automobiles and if luck is with them "get there" without using the street cars at all.

So, you see, that we have Competition.

Good business demands that we meet

*Sand, air and a clear head will save you.*

---

*When passing cars be ready for quick stop*

that—we know it because passengers have told us. Another reason why your best *service* efforts should be displayed to the passenger's view.

YOUR LIKES AND DISLIKES

YOU may have your likes and dislikes. Leave your dislikes at home. There is nothing to be gained by bringing them on the job Every passenger and patron of these lines stand on an equal in the *service* you are to give. That *service* is gauged only by the passengers' every need If lame, aged, or child, it is service to assist them on or off the cars, to a seat and to a safe place on the curb.

THE LADY'S FARE

IF a lady—and she does not need to be well dressed, nor beautiful, nor young, impresses you with the fact

*Keep a clear eye and a steady hand always*

---

*A "Rough" motorman has no friends*

that she has left her purse at home, it is none of your business why she left it there She wants to go some place or she would not have boarded your car Take her name and address. Ring it up as a fare and turn it in You can do this in a manner that will make her think you are the best friend she has or you can do it in a way that will make her think you are the most disagreeable person she has ever met.

It should be easy for you to select the service way It will be disagreeable for you if you select the other way.

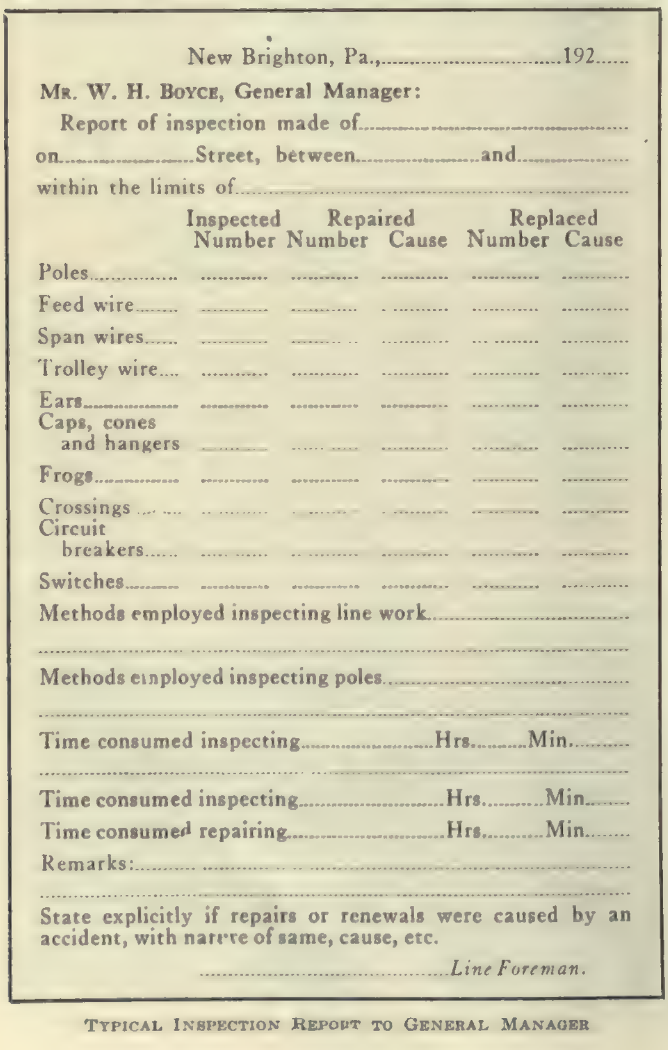
BE CLEAN

YOU represent this company on the cars. From the stockholders down to the smallest official this company is clean, frank and has nothing to conceal Representing the company you will understand that cleanliness in person, appearance, language, and mind is essential. While the company may be

*A "Smart" conductor will be found out.*

PAGES FROM A HAND BOOK ON SERVICE, ISSUED TO EMPLOYEES OF BEAVER VALLEY TRACTION COMPANY

neys. In many cases the schedules may be slowed down or speeded up to take care of the rush hour or the off-peak traffic. Operating expenses may be decreased and the public better served by a close study of your scheduled speeds. Why use the same running time for off-peak riding that you use during the rush hours, holidays or during stormy weather or when atmospheric conditions make a bad rail? If the running time is fitted for one condition it is quite likely to be wrong for the other.



New Brighton, Pa.,..............................192......

MR. W. H. BOYCE, General Manager:

Report of inspection made of..............................................

on..........................Street, between..........................and..........................

within the limits of..............................................

| | Inspected | Repaired | | Replaced | |
|---|---|---|---|---|---|
| | Number | Number | Cause | Number | Cause |
| Poles | | | | | |
| Feed wire | | | | | |
| Span wires | | | | | |
| Trolley wire | | | | | |
| Ears | | | | | |
| Caps, cones and hangers | | | | | |
| Frogs | | | | | |
| Crossings | | | | | |
| Circuit breakers | | | | | |
| Switches | | | | | |

Methods employed inspecting line work..............................................

..............................................

Methods employed inspecting poles..............................................

..............................................

Time consumed inspecting..........................Hrs..........Min..........

..............................................

Time consumed inspecting..........................Hrs..........Min..........

Time consumed repairing..........................Hrs..........Min..........

Remarks:..............................................

..............................................

State explicitly if repairs or renewals were caused by an accident, with nature of same, cause, etc.

..............................................*Line Foreman.*

TYPICAL INSPECTION REPORT TO GENERAL MANAGER

You cannot furnish service from the shop regardless of the personnel and equipment without reliable, up-to-the-minute records. If your car failures are increasing you should be able to determine from your records the causes of the increased failures. To depend on your memory and thus form the idea that the trouble is brakes, armatures or hot journals will not do. You must know absolutely the cause. Records, coupled with frequent meetings with department heads—individually and collectively—will bring out the cause.

To lull yourself into a sense of security because you have ordered such and such a thing done regularly will not do. Daily and weekly reports should form a basis for checking up on each department head. If things are not going as they should that does not give you an excuse to interfere in the department, but it does give you the information necessary for you to aid in making the department head make good or form the basis for his removal.

Where one man tries to run the details, or near details, of each department service cannot obtain. Sooner or later the alleged "system" breaks down.

Not only let but make department heads run their respective departments. Accurate, reliable, immediate records will let them, keep them, make them make good. If they make good you will make good by furnishing the proper service to the public.

## Employment Data for June, 1921

THE U. S. Department of Labor through the Bureau of Labor Statistics received and tabulated reports concerning the volume of employment in June, 1921, from representative establishments in thirteen selected manufacturing industries and in bituminous coal mining. When the figures of June, 1921, are compared with those of identical establishments for June, 1920, it appears that there were decreases in the number of persons employed in all industries except woolen, which shows an increase of 3.9 per cent. The most important decreases are 41.6 per cent in car building and repairing, 39.6 per cent in iron and steel, and 37.5 per cent in automobiles.

TRAILERS BEING LOADED AT DOWNTOWN MERCHANDISE DELIVERY AND RECEIVING STATION LOCATED UNDERNEATH "L" STRUCTURE

# Motor Truck Haulage in Chicago

### North Shore Line Has Receiving Station Close to Chicago Loop and Hauls Merchandise on Trucks to Rail Terminal—Study Shows Service to Be Costly Taken by Itself, but Valuable as Business Producer

BEGINNING in September, 1920, Britton I. Budd, president Chicago, North Shore & Milwaukee Railroad, inaugurated a downtown receiving and delivery station for the convenience of merchandise dispatch patrons and arranged to haul this merchandise by motor trucks between the terminal of the railroad and this downtown station. The latter was located on a piece of property over which the elevated structure is built at the corner of Franklin Street and Austin Avenue, only a few blocks from the Loop and very convenient to the large shippers in the central distrct. For hauling the merchandise shipments three large White tractors and ten two-wheel "highway" trailers were purchased. A folding support attached underneath each trailer at the forward end is used to lift the trailer body off the tractor and support it while it is being loaded and unloaded. This support consists essentially of two screw jacks operated simultaneously by a hand crank. The scheme makes it possible to keep the tractors working almost continuously while the merchandise is being placed in or removed from the trailers.

The Chicago merchandise dispatch terminal of the railroad is at Montrose Avenue, which is 6.3 miles north of the downtown or Franklin Street and Austin Avenue station.

Prior to the installation of this downtown station, an effort was made to give the shippers a service which would offset the disadvantage of their having to haul merchandise out to Montrose Avenue, as compared to delivering it to a steam road close at hand, and a contract was made by the railroad with a trucking company to pick up the merchandise at the shippers' premises and deliver it to the Montrose terminal, and also to deliver shipments from the Montrose terminal to the premises of the consignee. Three different trucking companies with which the railway contracted for this service at a flat rate of 18 cents a hundred pounds went broke. Furthermore, because of their financial troubles, they were unable to give satisfactory service, and there was endless trouble because of the divided responsibility between the trucking company and the railway company. In consequence the latter received numerous complaints for which it was not responsible. Difficulties of this kind led Mr. Budd to determine that the only way that these downtown shippers would be satisfied and their business retained was for the railway company to handle it itself. Accordingly, the facilities already mentioned were provided, and as a result it has been possible for the company to secure and handle satisfactorily an increasing volume of business which undoubtedly would have gone to the steam roads except for the convenience and speed of the service provided.

From Sept. 1, 1920, until March 15, 1921, the company made a charge of 10 cents per 100 lb. for hauling merchandise between Austin and Franklin and Montrose stations. This charge was simply added to the mileage charge between the Montrose terminal and any point on the railroad. With the great increase in competition since the first of the year, due to the material falling off in business available to all carriers, the company on March 15 issued a new tariff which made the Franklin and Austin station a regular railroad shipping point, for which the same rate in effect between rail points applied. On this basis, the gross charge on first-class shipments between the Montrose and the Franklin and Austin stations, as handled by motor trucks and including the extra handling at the downtown terminal, is 1.5 cents per hundredweight.

Franklin and Austin Station Loading Platform and Rear End of Trailers Showing Gates Used

A recent study on the actual cost of this service made for Mr. Budd by H. A. Johnson, organization engineer, developed some very interesting information which confirmed fairly accurately the estimates made prior to the installation as to the cost of securing the business which comes as the result of the downtown terminal. Exclusive of the cost of the operation of the station at Franklin and Austin, and the cost of loading and unloading trucks at this station, the cost of operating the trucks alone is shown in Table I.

The total business handled during the four months period named above, September to December, 1920, was 14,708.75 tons, and the mileage operated was 36,018. The average tonnage of merchandise per trip figures out to be 2.86. On the basis of these figures for four months, it is estimated that the company would handle during the year a ton-mileage of 103,011.48, from which a cost per ton-mile of merchandise handled of 33.2 cents is obtained, or the cost of handling 100 lb. of merchandise between the Franklin and Austin and the Montrose stations is 10.5 cents. Detail figures covering the actual operation of the motor trucks during the four months considered are given in an accompanying table.

The cost of operating the Franklin and Austin station for the seven months ended Jan. 31, 1921, is detailed in an accompanying tabulation. From this table it is seen that the average station cost for the seven months was $1.33 per ton of merchandise handled or an average of 6.6 cents per hundredweight. This includes the cost of operating the station and the labor cost of loading or unloading the trailers at this station—the one extra handling involved.

If the station cost is added to the transportation cost between the downtown and Montrose stations by motor trucks (10.5 cents per hundredweight), a total cost of 17.1 cents per hundredweight is found. Against this cost, the company formerly received 10 cents per hundredweight and now 1.5 cents per hundredweight.

Upon first thought this would appear to indicate a loss on the downtown terminal of 7.1 cents per hundredweight on the old basis, or 15.6 cents on the present tariff. The management believes, however, that this terminal must be considered from a broader point of view, as it is true that the cost of operating any terminal, if taken by itself, would show a loss. The broad question involved is whether the revenue derived from the entire service performed for the shipper by the railroad is sufficient to absorb the terminal and transportation costs and leave a profit. In the particular case of the North Shore Line, there is also the question of whether the downtown terminal brings to the company enough business that would otherwise not be

TABLE I—EXPENSES OF TRACTOR OPERATION

Charges independent of the amount of business done

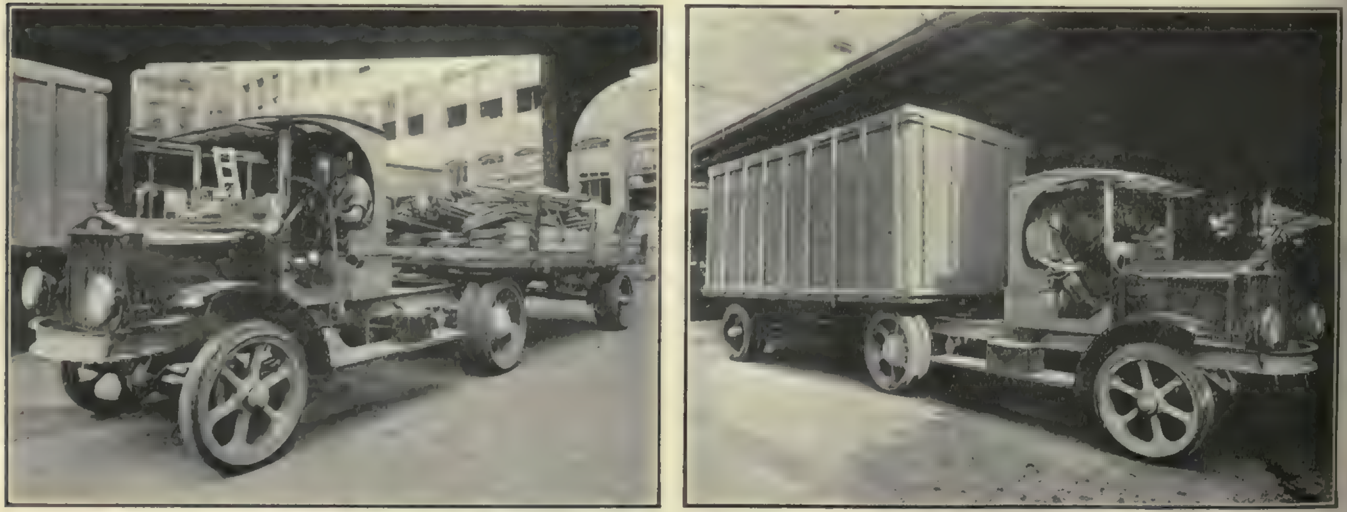
| | Per Year |
|---|---|
| Depreciation on three tractors based on 20 per cent of their cost, less tires | $2,451.03 |
| Depreciation on ten trailers based on 20 per cent of their cost, less tires | 3,155.40 |
| Interest on the investment at 6 per cent | 1,898.64 |
| Garage rent at $100 per month | 1,200.00 |
| Salary of superintendent of trucks and drivers | 2,220.00 |
| Insurance premiums | 1,739.28 |
| State and municipal taxes | 395.55 |
| State and city licenses | 240.00 |
| Cost of painting trucks and trailers once during their life, prorated | 260.00 |
| | $13,559.90 |

Expenses Varying with the Amount of Business

(Based upon the mileage made, the tons of freight handled and the costs of operation during the four months of September to December, 1920.)

| | Per Year |
|---|---|
| Wages for drivers | $11,310.00 |
| Tire renewals | 3,601.80 |
| Cost of gasoline | 2,932.23 |
| Cost of repairs (estimated) | 1,188 00 |
| Cost of oil | 649.08 |
| Cost of grease | 62.40 |
| Reserve for losses and damages | 882.53 |
| | $20,626.04 |

This makes a total cost of operation for one year of $34,185.94.



Types of Tractor and Trailers Used to Haul Merchandise Between Rail Terminal and Downtown Station—Note Trailer Supports Folded Back for Clearance on Road

TABLE II—COST OF TRANSPORTATION BY MOTOR TRUCK, CHICAGO, MILWAUKEE & NORTH SHORE RAILROAD

| | Sept., 1920 Individual Truck Performances | | | Oct., 1920 Individual Truck Performances | | | Nov., 1920 Individual Truck Performances | | | Dec., 1920 Individual Truck Performances | | | Total for 3 tractors for 4 months | Estimated total for 3 tractors for 1 year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of trips | 96 | 132 | 132 | 102 | 182 | 166 | 92 | 182 | 188 | 112 | 154 | 176 | 1,714 | 5,142 |
| Miles operated | 812 | 852 | 858 | 861 | 1,195 | 1,096 | 701 | 1,236 | 1,280 | 937 | 1,016 | 1,162 | 12,006 | 36,018 |
| Oil used—quarts | 50 | 52 | 51 | 89 | 90 | 94 | 98 | 99 | 99 | 58 | 181 | 96 | 1,057 | 3,171 |
| Gas used—gallons | 175 | 270 | 250 | 245 | 320 | 335 | 245 | 325 | 358 | 320 | 350 | 390 | 3,583 | 10,749 |
| Tons of freight carried | 188 | 474 | 353.25 | 255 | 484.5 | 534.25 | 194.75 | 518.50 | 596.00 | 219.50 | 423.50 | 515.00 | 4,936.25 | 14,708.75 |
| Miles per gallon—gas | 4.32 | 3.155 | 3.43 | 3.51 | 3.73 | 3.27 | 2.86 | 3.80 | 3.58 | 2.93 | 2.90 | 2.98 | 3.351 | 3.351 |
| Miles per quart—oil | 16.24 | 16.38 | 16.81 | 9.67 | 13.16 | 11.66 | 6.23 | 12.50 | 12.90 | 16.18 | 5.61 | 12.10 | 11.34 | 11.34 |
| Tons per trip | 1.958 | 3.59 | 4.04 | 2.50 | 2.662 | 3.218 | 2.117 | 2.840 | 3.170 | 1.96 | 2.75 | 2.925 | 2.86 | 2.86 |
| Cost of gas at 27c. gal | $47.25 | $72.90 | $77.50 | 66.15 | 86.40 | 90.45 | 66.15 | 87.75 | 96.66 | 86.40 | 94.50 | 105.30 | $977.41 | $2,932.23 |
| Cost of oil at 81c. per gal | $10.125 | $10.53 | $10.32 | 18.02 | 18.25 | 19.03 | 19.85 | 20.05 | 20.05 | 11.54 | 39.15 | 19.44 | $216.36 | $649.08 |

secured to justify the expense. While there is no way of telling just how much of the business handled through the Franklin and Austin station would be received anyway without this station and the trucking service, the officials of the company are satisfied that the downtown terminal does bring the company a great deal of business which would otherwise not be received. By virtue of this downtown delivery service in Chicago it is possible, for example, to induce some Milwaukee shippers to use the electric route, and after their patronage for Chicago is obtained other business which does not involve this expensive terminal handling and otherwise would probably have been given to the steam competitor is secured from them.

There is also the consideration that the present investment has provided facilities capable of handling a much larger volume of business with only slight increase in operating expense. Hence with increasing volume, the cost per hundredweight handled would lessen and the terminal cost be thus more easily absorbed, leaving a better profit on the total business. During 1920, with an investment of a little over half a million dollars devoted exclusively to the merchandise dispatch business, the traffic of this kind netted the C., N. S. & M. R. R. a surplus which amounted to 3.5 per cent on this investment after deducting operating expenses, interest, taxes and depreciation.

Among other things, this study has brought out the fact that if the company was contracting with an outside trucking concern for this service, including the maintenance of a warehouse by the trucking company and transportation between this and the Montrose terminal, it would cost that company at least 17 cents per hundredweight without figuring any profit for itself.

The Franklin and Austin station is also being used similarly as a downtown terminal for the Chicago & Interurban Traction Company, of which Mr. Budd is also president. The rail terminal of this Chicago-Kankakee (Ill.) line is at Eighty-eighth Street and Vincennes Avenue, south a distance of about 12 miles from the downtown station. About 10 per cent additional merchandise, above the tonnage shown in the accompanying tables, II and III, has been handled at Franklin and Austin station and hauled to or from Eighty-eighth Street. The cost of this service, however, was segregated from the figures given in these tables.

## Direction of Fibers Affects Strength of Fiber Boxes

**Where Fiber Is Used for Equipment Parts Its Strength to Rupture Can Be Increased by Attention to Direction of the Grain in the Material**

THE direction in which the fibers run in fiberboard boxes has been found to have a considerable effect upon the serviceability of the boxes. Fiber board does not tear as easily across the grain as with the grain; it may have two or three times as much strength in one direction as in the other, the difference varying with manufacturing conditions. This excess strength may be advantageously used to reinforce the weakest points of the box and so to produce a better balanced construction.

The weakest parts of fiber boxes are the scores or folds forming the edges of the box. It is impossible to have the fibers running perpendicular to every score, but usually they might be made to run perpendicular to the scores which receive the hardest punishment, or which tend to break open first. The location of the scores most liable to failure, of course, varies with the shape of the box and the nature of the contents, and can best be determined by test. The following comments and deductions are for boxes whose depth is less than their width.

In tests at the U. S. Forest Products Laboratory, on fiber boxes, it was found that the first break nearly always occurred in the horizontal end scores. By making up the boxes so that the fibers ran vertically instead of horizontally in the sides and ends, the first break throughout the length of a horizontal end score was retarded about 85 per cent. Through the same change, the horizontal side scores, which received the next hardest punishment, were strengthened so that the first break never occurred in them.

The gain in strength of the horizontal scores was, of course, accompanied by a weakening of the vertical scores. But since the upright scores do not ordinarily receive as great stress as the horizontal scores, and in these particular tests were not as likely to come in contact with sharp edges, they were able to stand a reduction in strength and yet not become the point of first failure.

TABLE III—COST OF OPERATION OF FRANKLIN AND AUSTIN AVENUE MERCHANDISE STATION FOR SEVEN MONTHS ENDED JAN. 31, 1921

| Month and Year | Tonnage Handled | Cost of Personnel | Rent per Month | Depreciation on Building | Insurance per Month | Light | Heat | Total Cost | Cost per Ton for Station |
|---|---|---|---|---|---|---|---|---|---|
| July '20 | 1,503 | $1,832.76 | $15.00 | $24.25 | $1.39 | $12.90 | $0.00 | $1,886.30 | $1.255 |
| Aug. '20 | 1,090 | 1,935.29 | 15.00 | 24.25 | 1.39 | 13.10 | 0.00 | 1,989.03 | 1.816 |
| Sept. '20 | 1,104 | 1,703.51 | 15.00 | 24.25 | 1.39 | 13.60 | 0.00 | 1,767.75 | 1.601 |
| Oct. '20 | 1,249 | 1,493.74 | 15.00 | 24.25 | 1.39 | 15.80 | 17.35 | 1,567.53 | 1.255 |
| Nov. '20 | 1,286 | 1,299.38 | 15.00 | 24.25 | 1.39 | 17.49 | 22.10 | 1,379.61 | 1.073 |
| Dec. '20 | 1,124 | 1,283.17 | 15.00 | 24.25 | 1.39 | 15.18 | 28.40 | 1,367.39 | 1.216 |
| Jan. '21 | 1,218 | ........ | 15.00 | 24.25 | 1.39 | 16.10 | 27.20 | 1,454.76 | 1.194 |

Average cost per ton for station, $1.332. Average cost per cwt. for station, $0.066.

# Electric Railway Publicity

*Devoted to How to Tell the Story*

## Publicity Must Be Temperate

**Successful Business Man, Discussing Utility Public Relations, Advises Against Scolding the Public—He Finds Analogy in Parent-Child Relation**

BUSINESS men in a certain large city have been puzzling their minds with efforts to analyze the reasons for the obvious public favor extended to one utility and the disfavor in which another finds itself. There are no radical differences in the merits of the two utilities or in their rights to the good feeling of the public. Indeed, the local critics of utilities have said almost exactly the same things against both in the usual course of recrimination. Yet there is a widespread and vociferous antagonism to the one and complacency to the other.

A business man made the following comment on the situation, extending his remarks into philosophical observations on human nature and children:

*Live in Live Louisville* *Live in Live Louisville*

***Louisville Railway Company***

Incorporated

The Louisville Railway Company was organized in 1889 as a consolidation of the Central Passenger Railway and the Louisville City Railway.

Today it is operating 168 miles of city trackage. The number of cars operated varies from 311 during rush hours to 125 during non-rush hours. It carries annually 80,000,000 cash fare passengers and 30,000,000 transfer passengers. By construction and purchase of seven suburban trolley lines, with 102 miles of track, the company has brought into intimate contact with Louisville a large and prosperous suburban population.

It gives employment to 1,806 persons (including the Louisville & Interurban) and its annual pay roll is $2,250,000. It purchases each year supplies and materials to the amount of $900,000, most of which is spent in Louisville.

Bonds to the amount of $12,035,000 and notes to the amount of $684,000 have been issued to provide for replacements, extensions and more modern service. All of these issues have been marketed through Louisville financial institutions. Seventeen hundred and eighteen stockholders, of whom 1,389 are citizens of Louisville, have invested $11,823,600 in this company.

The company has served this community for more than thirty years, providing new equipment as the need arose, and, up to the present time, has been able to make extensions and improve the service to keep pace with Louisville's growth.

**The above information prepared and published by**

***Citizens Union National Bank***

*Know Your City* *Boost Louisville*

ANOTHER BANK COMES UP TO SCRATCH

The solution of the problem can be found in the general managers. "A," manager of the "X" company, has tried hard to win public favor for his company and failed. "B," manager of the "Y" company, seemingly has made no effort to educate the public on the claims of his company to public sentiment. "A" has tried too hard; he has spent a great deal of time arguing with business men, giving out interviews and making statements, to show that the critics of the company were wrong. He has fought back and has kept alive all the antagonism that ever existed. He has not allowed the public to forget that the company was hated in some quarters. He may have convinced most of the citizens that the company was right and that it should have the co-operation of the public to secure the best results in service, but nevertheless the hostility has increased rather than diminished. It seems to me that his remarks are nearly always accepted as "propaganda," being therefore vitiated. The public estimates, far below their value, the remarkable accomplishments of this manager in the maintenance and improvement of service.

Now, "B" seldom addresses a public gathering and has never argued in behalf of his company. On a few occasions he has spoken very plainly regarding the co-operation which a community should extend to its utilities, but he has spoken goodnaturedly, without criticism of anybody or anything, and without intimation that criticisms had ever got under his skin. He has assumed all along that he and his company have no enemies; that the public is growing in appreciation of the service rendered and the larger service possible. Once in a while there is a flare against his company, a violent controversy over some element of service or rates; but nobody seems to be able to get up much enthusiasm for a sustained warfare. The manager allows the incident to wear itself out, without aggressive interposition from himself, and it does wear itself out in a few days and is forgotten.

I have been intensely interested in observing the different methods of these two managers, for the two methods are analogous to the methods of managers in private business and the methods of parents in the management of their families.

A factory or office manager, a superintendent or foreman may possess extraordinary qualities as a planner and director but fail in management because he does not know how to handle men. He may adopt aggressive tactics which keep his plant in a turmoil, arguing, exploding, commanding, criticising, until in course of time nearly every employee has acquired a secret grouch against him. However highly the employees may respect his technical skill, they cannot bring themselves to hearty co-operation with him. Another manager may not be so obviously the dictator in his plant, yet a quiet word from him may produce instant response, of the exact kind that results in the most efficient operations, an intelligent and loyal response.

A father may rule with a firm hand, punishing and scolding and reminding constantly of errors and improper habits, yet his family circle may present a far different picture than that which he had conceived and which his diligent attention might have reasonably been expected to produce. Another father, quite as ambitious and intelligently thoughtful for the development of his children, may seldom scold or punish, and yet may lead his children into harmonious and fairly complete compliance with his designs.

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The fact that more than twice as many passengers were carried by the local traction systems of New York City than were transported by all the steam roads of the United States is being given publicity in the July number of the *Elevated Express*, published by the Interborough Rapid Transit Company, to allow a realization of the enormous demands being made upon New York's traction systems. The actual number of passengers carried during 1920 is given as 2,356,000,000.

# Speaking of Noses

**Cutting Off Utility Noses Ruins Community Faces—Friendship, Not Feuds, Needed to Secure Progress—Railway Official Talks Out in Meeting**

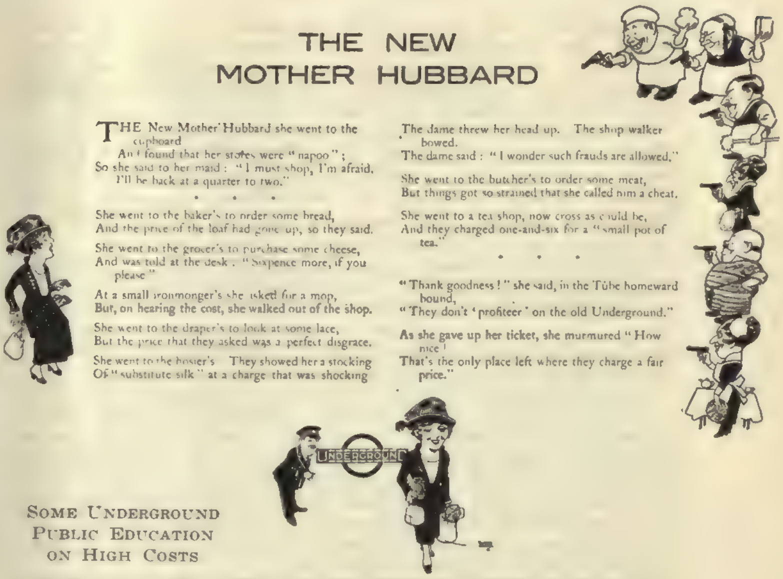
P. S. ARKWRIGHT, president of the Georgia Railway & Power Company, Atlanta, Ga., recently gave an address before the Lion's Club of Atlanta. His remarks were so pertinent to the general utility situation that they are abstracted below. It is understood that this address will soon be available in pamphlet form. It has already been widely quoted in Georgia papers:

A lot of us are not entirely pleased with our faces. Some of us may even have a spite against them. Cutting off our noses will certainly ruin our faces However, we won't let anybody persuade us that we can thus avenge ourselves and escape all injury. But, figuratively, many of us do this very thing time after time.

We did it with the steam railroads. We permitted our resentment to be aroused against them. We became violently prejudiced. We created an attitude of general hostility to them. There is no doubt of the fact that we injured them. We certainly succeeded in keeping them from operating profitably. We regulated them most stringently. We soaked them in damages whenever we got on the jury. We elected every public official who ran on the platform of antagonism to the railroads. We destroyed the confidence of the investing public in the safety of their securities. We kept them from getting new capital.

Now we have gone hunting for new game. There were the local public utilities—electric railways, gas, electric light and power and telephones. These services at first were small, but they developed rapidly. There were almost daily improvements in the supply and application of these services. Street railways were being electrified, consolidated into a system covering the areas of towns, spreading out into suburban districts, making possible the growth and expansion of cities. So with gas, electric light and power. All this was done in an atmosphere of friendliness and co-operation, resulting in fair treatment and just consideration of the utilities and of the public they served.

In the process the companies were of necessity becoming larger and larger; the amounts of money involved going up into the millions. The necessary capital, not being able to be obtained in the locality, was being drawn in from the outside. Increasing numbers of the population were becoming each day more and more dependent upon the services performed by these companies. They became shining marks. They were foreign owned. They were monopolies —necessary or natural monopolies, it is true, but abhorrent nevertheless. It was so easy to teach people to hate them. They came into more intimate contact with more members of the public than any other enterprise that does business with them. More people ride on the street car systems every day than the entire population of the city it serves. These people are of all kinds and dispositions. Some of them are apt to lose their self-control and to take offense or to give offense. The railway vehicles are operated as public vehicles, and each individual in using them has to give up some of his separate individual convenience in order that they may be kept capable of serving the general convenience. Customers had to submit to rules, and rules always irritate. We all go to business practically at the same time and return home at the same time. Naturally we can't all get a seat. Their properties of necessity occupy the public highways. They impede other travel; they are noisy; they have accidents. These companies furnish only service. We don't like to pay for service, nor can we stand for any delay in service or any slackness in service, no matter what the cause is. We get on the car and get off, and we have got no more than we had when we got on. We switch on the light and when we switch it off it's gone, with



THE NEW
MOTHER HUBBARD

THE New Mother Hubbard she went to the cupboard
An I found that her stores were "napoo";
So she said to her maid: "I must shop, I'm afraid,
I'll be back at a quarter to two."

* * *

She went to the baker's to order some bread,
And the price of the loaf had gone up, so they said.

She went to the grocer's to purchase some cheese,
And was told at the desk. "Sixpence more, if you please"

At a small ironmonger's she asked for a mop,
But, on hearing the cost, she walked out of the shop.

She went to the draper's to look at some lace,
But the price that they asked was a perfect disgrace.

She went to the hosier's They showed her a stocking
Of "substitute silk" at a charge that was shocking

The dame threw her head up. The shop walker bowed.
The dame said: "I wonder such frauds are allowed."

She went to the butcher's to order some meat,
But things got so strained that she called him a cheat.

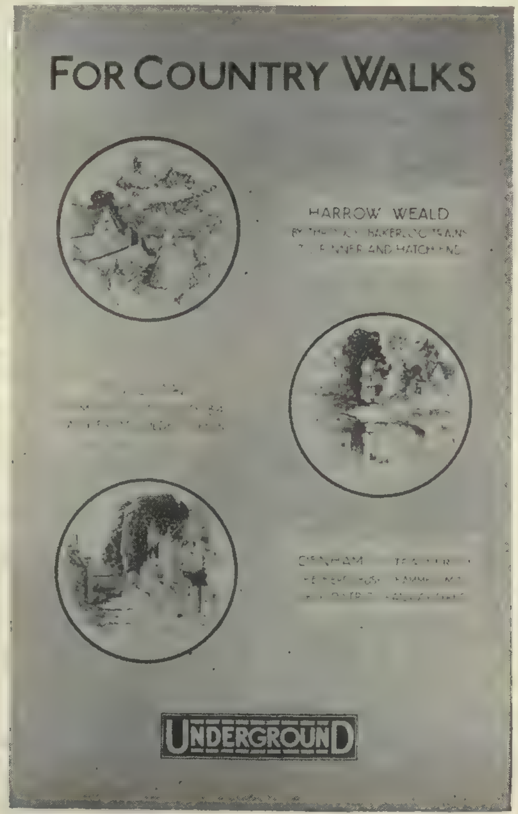
She went to a tea shop, now cross as could be,
And they charged one-and-six for a "small pot of tea."

* * *

"Thank goodness!" she said, in the Tube homeward bound,
"They don't 'profiteer' on the old Underground."

As she gave up her ticket, she murmured "How nice!
That's the only place left where they charge a fair price."

SOME UNDERGROUND PUBLIC EDUCATION ON HIGH COSTS



"UNDERGROUND" PUBLICITY IS OF A HIGH QUALITY AND THERE IS A GREAT DEAL OF IT nothing left. We turn out the gas and it is as if it wasn't there. We have got to have this service immediately when we want it and of the quality that we need. We can't wait for our light, or our power, or our heat, or our transportation. If the service is postponed it is no longer needed.

We are billed for it monthly in terms of quantity that we don't understand; measured by an instrument that we don't know anything about. The service is easily wasted. We are not willing to admit our own faults, so naturally we blame the service, but the fault may lie in our own extravagance or in the extravagance of our household.

Under these circumstances, it would be strange if, through a period of years, there was a single individual who had not at some time had a fault to find with the public utilities. The utility is therefore an ever-present, ready-to-hand, easily and usually successfully employed platform for the advancement of personal, political ambition.

I can understand people following a leader of that kind if they get any benefit from him. If abusing a public utility or taking out a spite on it brought lower fares, or better service, or nicer cars, or firmer tracks, or more extended facilities, probably the methods used could be justified in the ends achieved. It passes understanding, however, why any community should approve such methods when it not only brings no gain or benefit to the community but inevitably results in harm and injury.

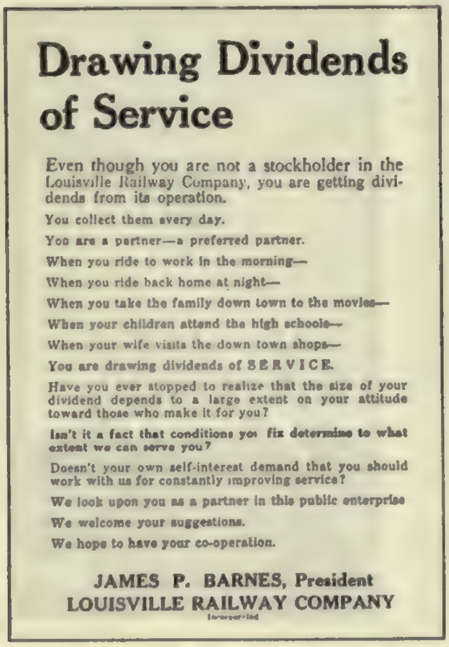
You are familiar, and unfortunately all the world is familiar, with the attitude of antagonism to the Atlanta utilities which has been engendered in this community during the past three years or so. What has been the result of this official attitude?

It has injured the company unquestionably; it has created a spirit of enmity among many of the people; it has made it difficult—practically impossible—to raise additional capital for the improvement of the service and the expansion of the utilities. It has increased the cost of such money as has been obtained. It has entirely reduced the efficiency of the employees and even on occasions almost demoralized them. It has greatly enlarged the cost of operation; it has retarded extension; it has impaired the quality of the service, and it has resulted necessarily in increased prices. All of which has injured the company, of course. But at what cost to the community?

It hasn't resulted in lower fares or rates. Notwithstanding the assaults, the fares and rates have increased because of necessity they must have increased under the conditions existing.

The service has not improved as a result of these attacks. This method hasn't been responsible for the repairing of a single new car or the laying of a foot of track or any improvement in quantity or quality of the gas or electric supply.

As a matter of fact, because of this attitude, it has been impossible to carry on the developments and improvement the company had planned, and among other things it forced the suspension of a hydro-electric development on which practically half the cost had already been spent. Can there be any question of the injury to the community?



Drawing Dividends of Service

Even though you are not a stockholder in the Louisville Railway Company, you are getting dividends from its operation.

You collect them every day.

You are a partner—a preferred partner.

When you ride to work in the morning—

When you ride back home at night—

When you take the family down town to the movies—

When your children attend the high schools—

When your wife visits the down town shops—

You are drawing dividends of SERVICE.

Have you ever stopped to realize that the size of your dividend depends to a large extent on your attitude toward those who make it for you?

Isn't it a fact that conditions you fix determine to what extent we can serve you?

Doesn't your own self-interest demand that you should work with us for constantly improving service?

We look upon you as a partner in this public enterprise

We welcome your suggestions.

We hope to have your co-operation.

JAMES P. BARNES, President
LOUISVILLE RAILWAY COMPANY
Incorporated

J. P. BARNES BELIEVES IN PUBLICITY

The interests of the community and its utilities are interdependent. Our properties are planted here and here they have got to stay. They can't be taken up and moved away. So we have got to make our success right here and it is dependent on the continued growth of this community. So with the community; its growth, prosperity and well being are dependent upon the character and quality of its public utility service, and anything that impairs that service or impedes an extension of it injuriously affects the community. My judgment is that the public utilities in Atlanta would have been developed 50 per cent more than they have been but for the official attitude of enmity and ill will toward them.

Atlanta has no ocean or great lakes or majestic river or navigable water. It has no iron, coal, copper, oil or other useful mineral deposits. It has no stupendous manufacturing plants or one overshadowing industry. Its natural advantages are location, accessibility and climate. No one locality has any monopoly of these advantages. So to make a city grow here requires effort, teamwork and co-operation. Atlanta could never have reached its present position as a financial, transportation and commercial headquarters of the Southwest with this dissension and discord among her people.

Let's apply this treatment of co-operation to our public utilities. It would be too much to hope that we should never quarrel with them, but let's stop having a feud with them.

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## This Speaks for Itself

THE Third Avenue Railway system in New York extends from the old Post Office in lower Manhattan to beyond the city of Yonkers on the north and the city of New Rochelle on the northeast. The lines below were drafted for use on the Third Avenue Division, which is the main stem and has headquarters at Sixty-fifth Street and Third Avenue, Manhattan.

THIRD AVENUE RAILWAY SYSTEM

COMMENDATIONS

"C" is for controllers, now under close watch.
To see if they're fed as they should—notch by notch.
So cut out your fast feeding and running between
Notches, resistance—you know what I mean—

"O" is for Observance; observe every rule.
Don't forget them the moment you leave Harlem School.
Keep them in mind and it's a safe guarantee.
You'll bring credit to yourself, the Division and me.

"M" is for Motorman; both the new and the old.
This little lecture to you I'll unfold.
"Do right all the time and commendations are yours.
Do wrong—well, you know we punish wrongdoers."

"M" is for Motto; let our Motto be,
To practice efficiency in the highest degree.
Avoid accidents—operating with care.
Be courteous to passengers, treat them all fair.

"E" is for Economy, daily practiced and preached.
We'll not relinquish a trifle 'til the highest standard's reached,
So let's all club together with vim and with pep.
And uphold what is known as "Third Avenue's Rep."

"N" is for Nickel, representing one fare,
We need all the nickels; the public's our payer.
Our duty, therefore, is to be courteous and kind.
Don't be grouchy or gruff and don't leave them behind.

"D" is for Danger; when you see it around
Have a care, watch your step or else you'll be found
On your back on a cot with kind hands on your brow.
Or perhaps you'll adorn the noted "Hoose-gow."

"A" is for Accidents, which mean heavy expense
Paid out in our hard-earned dollars and cents.
Let's try to avoid them I ask you again.
They're the source of much suffering, sorrow and pain.

"T" is for Troubles; our troubles are rare.
We're not hounded or pounded if we work on the square.
We're treated like white men, our worries are small,
In fact, it's up to ourselves to have any at all.

"I" is for Ireland and Italy too,
A good combination when mixed with the Jew.
All well represented on this road, I will say,
And strongly backed by the old U. S. A.

"O" is for Only; there's only one road.
And that's in Manhattan and right well we know it.
We plug all day long traveling uphill and down
Carrying patrons with safety all over the town.

"N" is for Never: We must never grow stale,
Whether running on dry or on slippery rail.
We must operate right Commendations to gain.
If we don't do what's right the Boss will raise "Cain."

# Equipment and Its Maintenance

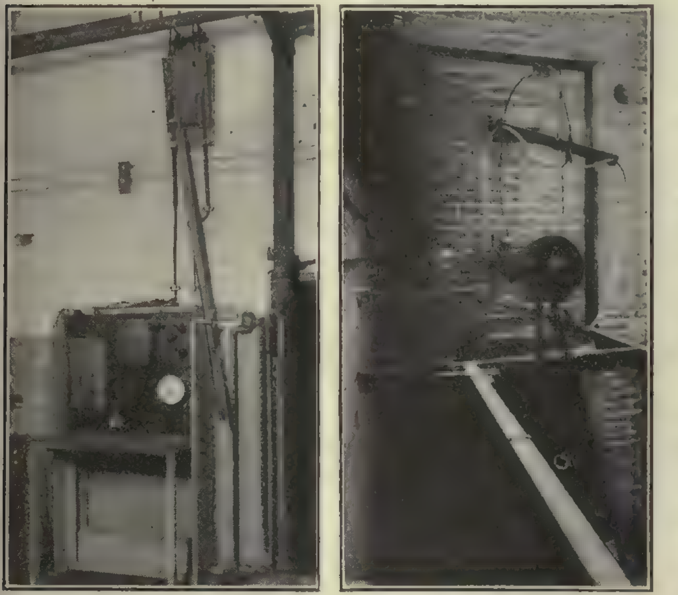
*Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments*

## Plow and Circuit-Breaker Testing in Washington

**The Overload Current Testing of Plows Used on the Underground Conduit System of the Washington Railway & Electric Company Plays an Important Part in Preventing Trouble in Service**

FOR proper calibration of circuit breakers and current test on current-collector plows which are used on the cars of the Washington Railway & Electric Company the switchboard and water rheostat shown in the accompanying illustration were erected close to the place where these pieces of apparatus are repaired.

The switchboard has a slate base and is mounted at a distance from the floor convenient for the operator. The double-pole switch shown mounted on the wall above the switchboard is an isolating switch which cuts off all current from that point when the switch is out. This is easily operated by a long wooden handle. As a caution to the operator, when this switch is in and the board is "alive" a five-light circuit of red lamps burns on the board. These are shown in the upper right-hand corner. The double-pole, double-throw switch at the left of the board is for the purpose of adjusting polarity changes of the circuit which frequently occur on this road with the metallic return circuit. The circuit breaker in the center of the board is set at 800 amp. and a 0-to-800-amp. ammeter shows the current taken.



AT LEFT, SWITCHBOARD FOR CIRCUIT BREAKER AND PLOW TEST; AT RIGHT, WATER RHEOSTAT WITH TESTING EQUIPMENT

The water rheostat for regulating the value of the testing current is located outside the building and operated through a shaft by the wheel shown in the center of the switchboard. The movable terminals of the rheostat are raised or lowered through ropes which operate over sheaves mounted on this shaft. The rheostat is made up of two old oil barrels with the circuits connected to them in parallel so as to reduce the heating of the brine as much as possible. The arrangement of the barrels, operating equipment, shafts, counterweights, etc., is readily seen in the illustration, and a window to the left of the switchboard furnishes a convenient means of watching the operating of the rheostat from the inside of the building, while its location on the outside insures that no obnoxious fumes will interfere with other work.

## Large Automobile Interests Enter Motor Bus Field

THE Republic Truck Company, one of the John N. Willys subsidiary companies, enters the motor bus field with a specially designed single-deck motor bus equipped with the Knight sleeve-valve motor. The company plans to co-operate with the railway companies in the development of the motor bus field and Col. Frank Smith, first vice-president and general manager of the Republic company, has created a public utilities division under the direction of Ralph M. Sparks, formerly of the Bay State System, Boston, who has been appointed manager of this division.

The Republic company has made a comprehensive study of motor bus operation as it exists in the United States and abroad and believes, with most experienced bus operators, that the ordinary truck chassis is not suitable for passenger transportation. A specially designed unit is now being built. Particular attention has been paid to spring suspension, body overhang, tread of wheels, etc., to insure comfortable riding under varying loads. The type of motor used is the same as that which has been adopted as standard by the Fifth Avenue Coach Company in New York.

The all-steel body is hung so that the floor level above the ground is approximately 24 in. With a folding two-panel door of good dimensions and low steps, passenger interchange can be accomplished with a minimum of delay. A form of cushion wheel and tire is used. To insure further comfort to passengers and at the same time cut down maintenance, an electric gear shift is used. In addition to the electrical attachment there is a regulation hand control, which is used only in emergency. Cross seats are used in the bus, which has a seating capacity of twenty-five passengers, except over the rear wheels, where longitudinal seats are necessary because of the low-floor feature. A fare box is conveniently located in the front.

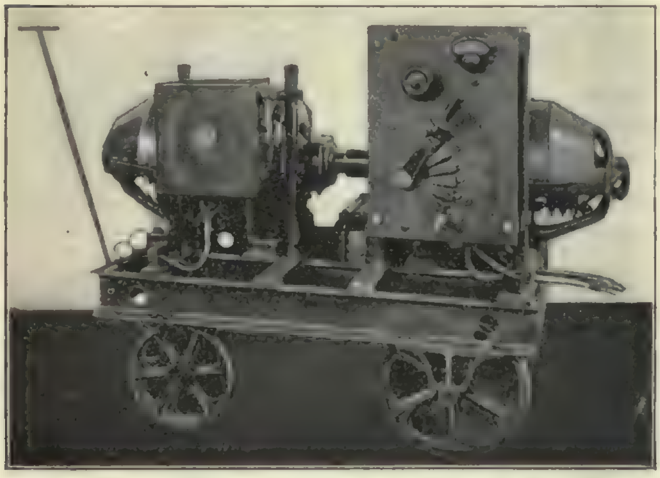
A completed bus will be presented for inspection of the railway companies some time the early part of August.

## New Variable Voltage Welding Set

THE General Electric Company has recently placed on the market a new type of electric arc-welding equipment for operation from variable-voltage, direct-current trolley circuits.

The equipment consists of a standard type WD-9 4-kw., 60/20-volt, 200-amp., self-excited arc-welding generator direct connected to a type RF-10-A constant-speed, variable-voltage, direct-current motor. The motor is designed to maintain practically constant speed on voltages varying momentarily from 400 to 650 and is provided with compensating pole-faced windings as well as commutating poles.

The generator is designed so that at constant speed the energy delivered at the arc is practically constant. Since the voltage and current follow the momentary variations in the arc conditions practically instantaneously, the lag which causes defects in the weld is eliminated. By the adjustment of the dial switch on the panel, the current may be adjusted from 200 to 75 amperes in 25-amp. steps. Intermediate steps are provided for by adjustment of the field rheostat.


VARIABLE-VOLTAGE, DIRECT-CURRENT WELDER

The sets are assembled complete with generator panel, motor starting equipment and stabilizing reactor, all mounted on a structural steel base. The equipment may be made portable by the addition of running gear.

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## Greasing and Cleaning Tracks

THE maintenance department of the Seattle Municipal Street Railway has systematized its track greasing and switch cleaning. The trackage of the system is divided into routes of an average of 12 miles each, with a track greaser assigned to each route and a relief man to take the place of each regular greaser. This relief man also takes the place of the oiler on the cable line four days in each month, and by this arrangement each man has two days a month off. A foreman reporting direct to the maintenance engineer has charge of the men.

The schedule of greasing requires that each route should be covered at least twice daily and in some special cases three times daily. The various parts of the track greaser's outfit are shown in an accompanying illustration and consist of a grease bucket, a switch cleaning iron, a copper oil can, a grease swab and a deck broom.

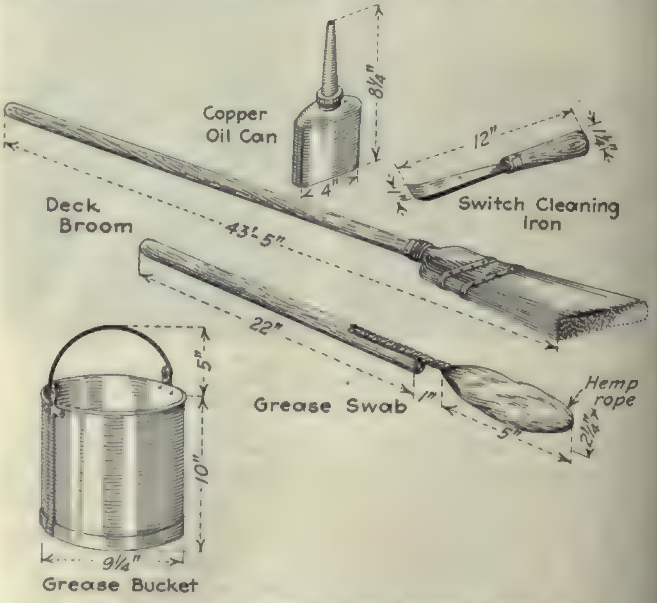
The galvanized iron grease bucket holds 12 qt. and has straight sides with a rim around the bottom ¾ in. wide, made by turning up the bottom onto the sides and firmly soldering the edges together. This gives a substantial rim for the bucket to rest on and the bottom of the bucket rests on the inside of this rim. The top rim is made of 3/16-in. wire.

The greaser uses a swab which has a wire framework composed of four pieces of wire each about 20 in. long, crossed at the bottom, through which are drawn strands of either hemp or manila rope 3½ in. long. After the swab is filled to the required height and dressed down to the required shape with shears the wires are drawn together and twisted tight at the top. This is then attached to a wooden handle to make it of convenient length for the use of the greaser.

TRACK GREASER WITH EQUIPMENT FOR WORK

A No. 8 deck broom is also carried by the greaser for cleaning out switches and for cleaning between the guard and running rails. In addition he also carries a switch cleaning iron which is made in the company's shops and is about 9¼ in. long, set into a round handle 2½ in.

The total length of this cleaning iron is thus approximately 1 ft. and can be carried in the side pocket in the man's overalls. A small copper oil can is also carried with switch oil to be used on the switches.



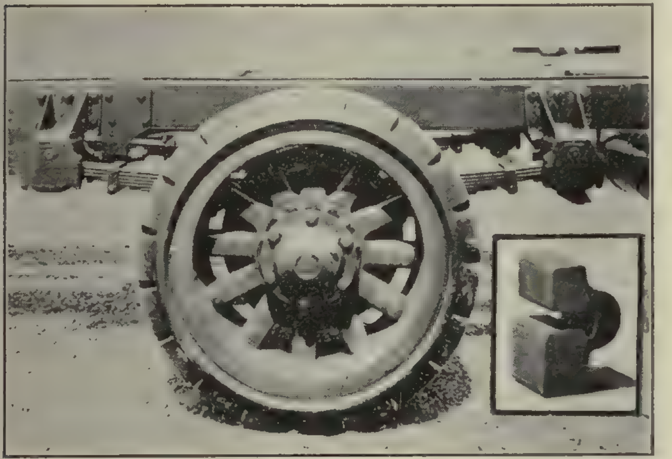
TRACK GREASER'S OUTFIT OF THE SEATTLE MUNICIPAL STREET RAILWAY

In addition to the regular work of cleaning and oiling, the track greaser also reports all defects that he may find in either tracks or switches. This information is given direct to the office so that emergency men may be sent out immediately to make any necessary repairs.

## Rubber Spring Blocks Improve Riding Qualities of Bus

THE International Motor Company has developed and applied to several of its Model A B Mack chassis in motor bus service a novel easy-riding device. A rubber spring block, so called, acts very much like a shock absorber of the cushion type, although in this case the device which takes the blow is in compression whether the load is up or down.

These rubber spring blocks do away with the usual spring shackles. They are held fast in a housing that is bolted or riveted to the chassis frame. In order that the springs may function properly in carrying their share of the load, lipped plates are riveted to the ends of the two top spring leaves, which then fit into the mouth of the spring block inclosing the lips and holding the upper and lower members of the block in compression at 100 lb. per square inch when bolted up.



View of Rear Spring Suspension Showing Housing Surrounding Rubber Spring Block—Insert, Rubber Spring Block Itself

Road tests that have been run by the motor company indicate the life of the spring block is about 30,000 miles. It will take but a small percentage of time to renew these rubber blocks as compared to replacing bushings, pins, etc., in the ordinary form of spring suspension. The truck manufacturers claim this can be done in an hour.

The illustrations show the details of the method employed to fasten the spring block housing to the truck frame as well as the shape and design of the rubber blocks.

## Freight Locomotive for New York Municipal Railway

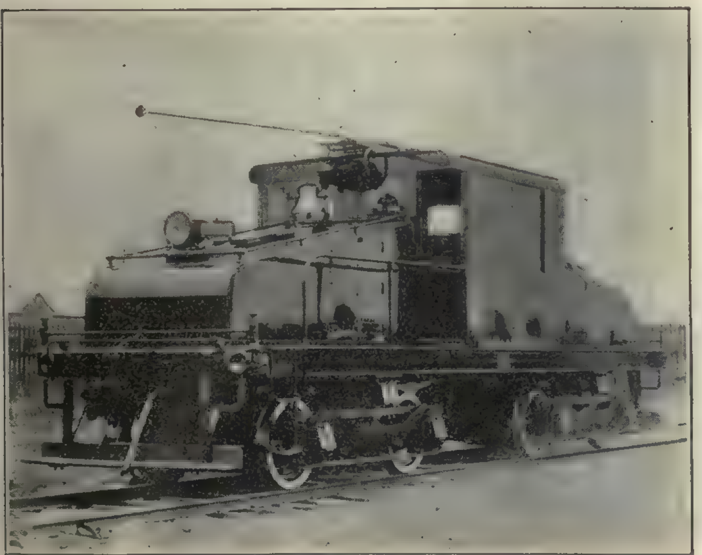
THE New York Municipal Railway has recently placed in operation an additional 50-ton, 600-volt electric locomotive for handling freight service. At the one-hour rating the new locomotive will develop a tractive effort of 16,500 lb. running at a speed of 13.8 m.p.h., and will haul an 800-ton train on a level track at 15 m.p.h.

The locomotive is designated class 404-E-100-4GE248 and carries all of its weight on drivers. The cab is of the sloping end, steeple type of construction and extends practically the whole length of the underframe. The central portion contains the master controllers, air brake operating valves and similar equipment adjacent to the operator's positions. The underframe consists of four heavy steel channels extending the entire length of the platform and tied together by heavy end-frame box girder castings and bolster plates. Each channel is riveted to the webs of the end-frame casting and to the top and bottom bolster plates. The bolsters are built up of 1-in. steel plates, 18 in. in width, riveted to all four longitudinal sills.

The draw-head castings are bolted to the center sills, which in turn are riveted to the end frames. The draft gear consists of MCB couplers with 5 in. x 7 in. shank and standard twin springs and follower plates. The whole platform is floored and braced by heavy steel plates running the width of the locomotive and riveted to the longitudinal sills. The usual wood floor is used in the cab.

The side frames of the two four-wheel trucks are built of heavy rolled bars for top and bottom members with cast steel pedestals. The bolster or center transom is bolted rigidly to the side frames and the entire weight of the truck is supported by semi-elliptic springs hung by links to the double side equalizer bars, which in turn rest on the journal box. The journals are of standard design with MCB bearings and wedges. The wheels are solid rolled steel, 34½ in. in diameter, with MCB treads and flanges.

The locomotive is driven by four 600-volt box frame



New Freight Locomotive for Brooklyn

Operating Equipment in Cab

ventilated railway motors of the same general design as those used on the subway cars of this company. Each motor is geared to the axle through single reduction with a gear ratio of 3.88. The control equipment is type M arranged to give three motor combinations, series, series-parallel and parallel. There are seven steps in the first position, six in the second and five in the third. The motor rheostats and various parts of the control equipment are housed under the sloping end cabs, conveniently arranged for inspection and repairs. Current may be collected either through third rail shoes or overhead pole trolleys. On account of the local conditions there are some limiting clearances which require a very low over-all height. This locomotive is arranged to operate under a minimum clearance of 12 ft. 2 in. over the trolley retracted. A change-over switch is provided to isolate the third rail shoes when the trolley is being used, thus eliminating the danger from exposed live parts. The trolleys are isolated in a like manner, when the switch is thrown to take current from the third rail.

| | |
|---|---|
| Total weight | 100,000 lb. |
| Length over buffers | 37 ft. 4 in. |
| Width over all | 8 ft. 7 in. |
| Height over trolley retracted | 12 ft. 2 in. |
| Total wheelbase | 25 ft. 7 in. |
| Rigid wheelbase | 7 ft. 4 in. |
| Diameter of wheels | 34½ in. |
| Total hp. one-hour rating | 600 |
| Tractive effort at one-hour rating | 16,500 lb. |
| Speed at this rating | 13.8 m.p.h. |

## Thermal Stresses in Steel Car Wheels

THE Bureau of Standards announces in Technical News Bulletin No. 51 that results obtained from tensile tests on material taken from cast-iron and rolled-steel car wheels and thermal expansion data obtained on similar materials has enabled computations to be made of the stresses set up by heating the tread of various steel wheels. It was found that the stresses on the outside of the wheel were in compression near the tread and in tension near the hub, the maximum value being in each case greater than the proportional limit of the material. This distribution is similar to that previously found in the single-plate cast-iron wheel. In order to analyze further the stress distribution in the wheels, some of them are being prepared in such a way that stress measurements can be taken on the back and also in a circumferential as well as a radial direction.

## New Combination Stop Sign and Strain Insulator

THE Technical Products Company, Pittsburgh, Pa., is marketing a strain insulator sign designed by C. Fred Sauereisen of Pittsburgh. This sign is made from the same material as high-voltage insulators. It is white with black letters which are burned into the sign making it acidproof. It is mechanically strong and not affected by the weather, and the rain will wash off all dirt. This insulator is intended for use on guy wires and offers a uniform design for signs as danger signals and to designate car stops, line voltage, and other similar variables.

## Small Oven Proves Useful

### Omaha & Council Bluffs Street Railway Makes Small Portable Coil-Winding Oven for Armature Coils, Which Makes Them Easier to Handle and Less Subject to Damage

BY O. A. NORENE
Assistant Master Mechanic Omaha & Council Bluffs Street Railway

ACCOMPANYING illustrations show a small portable oven which has been constructed in the shops of the Omaha & Council Bluffs Street Railway for use in connection with armature coils. The oven is made of No. 24 gage sheet steel mounted on legs of 1 in. x 1 in. x ⅛ in. angle iron, so that the oven itself is at a convenient height for armature winders. The dimensions of the body of the oven are 28 in. wide, 20 in. deep and 24 in. high. The sheet steel door is hung on common spring screen hinges. The heater element is wound of No. 24 gage Nichrome wire with a resistance of 200 ohms and is mounted on standard porcelain heater tubes. Connections for the line are made through Crouse-Hinds R.Q.K. receptacles and plugs to outlets which are available near the different winding stands.

These ovens have been found to be of great value in winding armatures, as the armature coils which lie in storage for any length of time become hard and can be easily damaged when they are being installed on the armatures by the armature winders. By putting the coils into the oven for a few minutes they become pliable and easy to handle and so much less subject to damage by handling.

Another convenience of this oven is that on account of the light materials used in its construction it is easily moved about as needed.

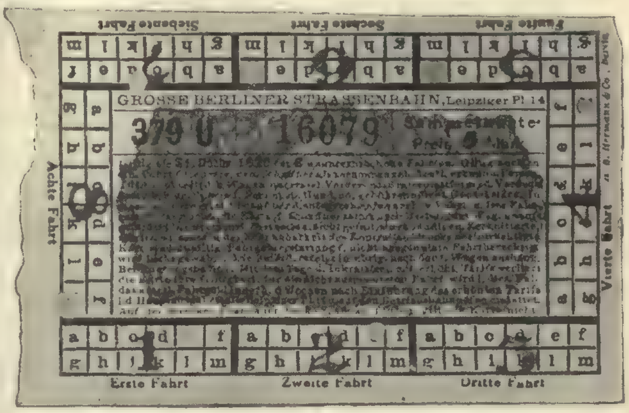
TWO VIEWS OF PORTABLE OVEN BUILT IN OMAHA SHOPS

## Berlin's Eight-Ride Punch Ticket

THE purchasing power of the mark has declined so greatly within Germany itself that the electric railways of that country are compelled to charge fares as high as 1 M or ten times the usual pre-war fare (10 pfennig) in unit-fare cities. The Grosse Berliner Strassenbahn at last accounts is charging 70 pfennig, which at the pre-war rate of exchange would mean a 14-cent fare instead of its old 2½-cent fare.

To temper the wind for the regular rider, the management sells an eight-ride ticket for 5 M (500 pfennig), whereas eight individual rides would cost 5.6 M (560 pfennig), the reduction being 12 per cent. The particular ticket reproduced is marked as good for eight rides taken before Dec. 31, 1920, either for one rider at a time or for several who make use of the ticket in common. The conductor makes a perforation in one of the lettered sections in the group marked "First trip," "Second trip," etc. There are twelve letters in each section, and the conductor selects for punching any letter he wishes in each trip.

Among the interesting regulations printed on this ticket are the following: Animal and baggage charges may be paid for by punchings on the ticket; tickets so crumpled, folded or mutilated as to make inspection difficult are void; no refund is made for unused trips except in case of a fare increase, when payment will be made within six weeks thereafter, either at the headquarters or the operating carhouses. The last provision clearly prevents the presentation of old tickets for new and higher fares.



EIGHT-RIDE TICKET OF BERLIN STREET RAILWAYS SOLD AT 12 PER CENT DISCOUNT OVER CASH

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## Warnings on Coal

### Washington Officials Suggest Its Purchase Now to Avoid Possibility of Its Shortage Later

TWO warnings have come to the joint fuel committee of the national public utility associations that it would be very desirable for the utilities to bunker coal at this time when it can easily be obtained. One of these warnings was sent on June 24 by Edgar E. Clark, chairman Interstate Commerce Commission, to G. W. Elliott, secretary of the national committee on gas and electric service, and reads in part as follows:

> As you doubtless know, the production and shipment of bituminous coal has been and is disappointingly low. You, of course, recall the difficulties of last year during the late summer and fall which grew out of the fact that there had been a general disinclination to buy and provide necessary supplies earlier in the season.
>
> In the interest of avoiding a repetition of those circumstances the commission has requested me to write you suggesting the importance, as we see it, of securing as promptly as possible a reasonable reserve against the difficulties that will be presented if later we get into a sustained period of so-called car shortage, and to request that you bring the matter actively to the attention of the members of your association.
>
> We appreciate, of course, that it is impracticable to put into storage an entire winter's supply. What we are suggesting is the accumulation now while transportation is easy and cars are idle of a reasonable reserve supply which will help out greatly if and when the pinch comes.

A second letter was sent by Secretary Hoover of the Department of Commerce on July 8 to J. W. Lieb, chairman of the joint fuel committee of the national utility associations. Mr. Hoover says:

> I would like to call the attention of your association to the bituminous coal outlook. There is every indication that there has been an undue slackness in the purchase of coal which may accumulate to large demands in the autumn. I am convinced that due to the general depression the price of bituminous coal at the mines is not too high at the present time. This is, I think proved by the fact that numbers of operating coal companies are making no profit whatever. If there should be a recovery of business activities in the autumn, taken in conjunction with the large increase in percentage of disabled cars (from 5 per cent to 16 per cent during the past six months) and the inability of the railways to finance their maintenance there are possibilities of development of a most serious situation as regards coal movement.
>
> I cannot but feel that the Interstate Commerce Commission in the face of warnings it has sent out would not be disposed to give any priority in such an event. It seems to me, therefore, to be obvious that the public utilities companies, both in their own interests and the protection of the public, should make early provision for stocks of coal sufficient to carry them over a critical period.

Mr. Lieb, in acknowledging these letters, said that he appreciated the timely suggestions and that he would send copies to the three associations.

# American Association News

## T. & T. Executive Committee Meets

ON JULY 20 the executive committee of the Transportation & Traffic Association met at headquarters to pass on several committee reports that have been prepared for presentation at the coming Atlantic City convention. Those present were R. P. Stevens, Pennsylvania-Ohio Electric Company; President A. Gaboury, Montreal Tramways; L. H. Palmer, United Railways & Electric Company, Baltimore; R. E. McDougall, New York & Harlem Traction Lines.

Reports of the committees on safety work, traffic regulations, personnel and training of employees and economics of schedules were approved, subject to minor changes and corrections. Other reports are to be approved by letter when received.

A tentative convention program was mapped out and a list prepared of those who are to be asked to discuss the various reports.

The personnel of the committee on subjects for next year's work was also discussed. This anticipates having the report of the committee available for the first executive committee meeting following the close of the convention.

## Resolutions on the Death of William Bloss

"BILL" BLOSS was a much-beloved character in the ranks of the Central Electric Railway Association, and he did much to add life and spirit to its meetings and activities. It was singularly fitting, therefore, that the association should pay tribute to his memory on the recent boat trip, where his absence was felt most keenly.

The association at this meeting adopted an appropriate resolution which recounted the many ways in which Mr. Bloss had been a vital factor in the association's success and had endeared himself in the hearts of the various members. His untimely death was deeply regretted.

## Executive Committee Will Meet August 5

THE meeting of the executive committee of the American Association which was tentatively arranged for Aug. 5 has been definitely set for that date. The business before the committee will be consideration of the report of the special reorganization committee, an abstract being printed in last week's issue of this paper.

As was mentioned at that time, the executive committee, through President Gadsden, has requested the membership at large to make suggestions or criticisms which will help the committee in its deliberations.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Suspension Seems Probable

### Court Has Under Consideration Ordering Des Moines City Railroad to Withdraw All Service Aug. 1

Unless further objections are offered Judge Martin J. Wade of the federal court will order a complete suspension of service by the Des Moines City Railway in Des Moines on Aug. 1. In an order of court filed July 15 Judge Wade made clear his intention to authorize the shut down unless some solution of the difficulties is found before the date set. Judge Wade has fixed July 21 as the date for filing final objections.

In the order filed Judge Wade indicated that the fifteen days' respite was granted in order to allow the trustee for the bondholders time in which to offer more urgent objections and suggest an alternative. The order specifically directs that the trustees be notified of the court's intention and grants until July 21 for objections to be filed. In so far as the trustees for the bondholders and the owners, who are represented by operating receiver F. C. Chambers, are practically identical there is little question that the plea filed by the receivers will meet objection from the trustees.

In making his order Judge Wade makes clear that in the event suspension is ordered on the final hearing it will be the end and that the entire question will be disposed of by a sale of the property by the receiver without waiting for foreclosure proceedings by the bondholders. The court said:

> I do not feel at liberty to make a final order at this time with reference to operation, because I feel that the bondholders and the general creditors should be consulted with reference to the suggestions of the court that the whole matter should be disposed of not through foreclosure, but by direct sale by the receivers. I am advised that such sale may be with the franchise, or if an acceptable purchaser is not thus found, that the property may be sold separate from the franchise.

Judge Wade serves notice on every one concerned and particularly to the citizens of Des Moines:

> That he cannot force the backers of the railway to advance another cent to keep the road in operation.
>
> That in his opinion the city by allowing bus competition has violated the car franchise as vitally as the company did by increasing fares.
>
> That further deferring the end will serve no good purpose.

The judge points out that the Harris interests already have sunk $500,000 in the system, "not one cent of which they were required to furnish under the terms of the franchise, or under any personal obligation of the company."

The order definitely upholds the contention made by Corporation Counsel Miller in his letter to the City Council that the fare section of the franchise was null, and characterizes the franchise as one that is "physically impossible to be complied with even with the highest fare that the traffic will bear."

The fare section of the franchise is handled thus in the order made by Judge Wade:

> It has been recently held by the Supreme Court of the United States that a fixed, arbitrary fare in a franchise is contrary to law and public policy, and therefore not binding. This holding, I as well as every private citizen must respect.
>
> In connection with the demand that the court compel the owners to operate under the terms of the franchise, it is well to bear in mind that the city itself violated the spirit and purpose of the franchise admitting to the streets in direct competition with the street railway a system of buses which reduced the income of the railway, operating at full capacity to the extent of $2,000 a day.
>
> A careful investigation satisfied me that if the bus competition was not brought into Des Moines and things had continued as they were going last January the equipment which was removed could have been retained and the fare at the present time would be reduced to 7 cents, with full and adequate service.

Aside from Judge Wade's order the most important development of the week was the opening of negotiations with the City Council by the street car men's union for a service-at-cost franchise.

No definite statement as regards the service-at-cost plan has been made by representatives of the Des Moines City Railway, but Attorney Gamble for the company stated that the company would be willing to "meet the men half way."

Judge George Wilson, representing owners of the company, directed a letter to Mayor Barton, in reply to one from the city head asking for a further proposal on the part of the company, in which he said that the company had made its "rock bottom" offer.

## Memphis Would Cut Wages

The employees of the Memphis (Tenn.) Street Railway have lined up against a proposed cut in wages of 12 cents an hour, notice of which was served on them on July 2. A preliminary conference between representatives of the company and the executive board of the union has been held in an effort to clarify the situation. They are still discussing the problem. The contract between the railway and its employees expires on July 31. The proposal of T. H. Tutwiler and F. S. Elgin, receivers, to cut wages is preliminary to their entering into a new contract with the employees. The men on their side have asked for minor changes in working conditions, but have made no demand for any increase of wages.

The present wage scale is 47 cents an hour for first-year employees, 52 cents for second-year employees and 57 cents an hour for employees of two or more years' service. In the event of failure to reach an agreement under the terms of the contract now in force, the matter goes to arbitration.

## Electrification Proposed

### Western Railroads Again Have Engineering Expert at Work on Program —Rate Fight Being Waged

It is stated that the bitter fight now being waged on the Pacific Coast between steam railroads and steamship lines growing out of rate reductions may result in the electrification of the steam lines on the Pacific Coast. This rate slashing fight started during the past winter when the steamship lines plying between Eastern seaboard points and Pacific Coast points via the Panama Canal began cutting their rates and obtained a large share of the freight haul on citrus fruits and other products from the West to the East; also, a similar cutting of freight rates by the steamship lines took place in coastwise freight business on the Pacific Coast.

### RATE-CUTTING WAR

That this cutting of rates by the steamship lines may bring about electrification of the steam roads was indicated in a communication from the Federal power commission. According to O. C. Merrill, executive secretary of the commission, the Western railroads now have experts at work on computations and engineering problems looking into the electrification of the steam lines. Electric power at five-eighths of a cent a kilowatt-hour is so much cheaper than either coal or oil that the use of electricity in itself would bring about a reduction in freight rates, Mr. Merrill asserts. He said further:

> Another effect of electrification that would bring about lower rates is that 30 per cent of the traffic on both coal and oil burning roads is used in carrying fuel for their own locomotives. The electrified carrier sends its fuel by wire and uses the rolling stock thus released for "cash customers."

The five-eighths of a cent cost for power is based on the cost to the Chicago, Milwaukee & St. Paul for its electrified lines. According to Mr. Merrill that road over its electrified lines forwards twice as many cars at the double speed, thus effecting a very large saving. Mr. Merrill's report was made to Senator Shortridge of California.

## All Night Service in Albany

Officials of the United Traction Company, Albany, N. Y., hinted on July 16, at a resumption of all night service on Albany lines within a few days. Saturday marked the renewal of all night service on the red and blue lines, between Troy and Waterford and Cohoes, and the white line, between Albia and Cohoes. All night service has been discontinued on the Albany lines since Jan. 29, when the strike was called. Company officials declare the situation is now about normal.

### Traffic Suspended Three Months in Wage Controversy

Traffic on the entire system of the Scranton, Montrose & Binghamton Railway between Scranton, Montrose and Lake Winola, Pa., was expected on July 9 to be resumed within three or four days as a result of action by the platform and maintenance employees in accepting a reduction in wages. The readjustment in the pay is to virtually the same scale rejected repeatedly by the men since the road was tied up on April 18 last.

The settlement involves a cut of approximately 12½ per cent with minor concessions granted by the company. The reduction for trainmen is from 51-60 cents an hour to 49-53 cents an hour. One of the contentions with the employees was over the right to operate one-man cars. The old working agreement called for a full crew. This point was finally conceded by the employees. The closed shop was also contested. This point was also conceded by the employees. The road is to resume on the open shop basis.

It was announced on July 9 that every effort would be made to resume operation at once. It was impossible at that time, however, to say just when this would be, because the line, machinery and cars have all been idle since April 18 and must be put back into shape.

The former employees of the company will be reinstated with their priority rights wherever possible and none of those who participated in any way in the suspension will be punished. Trackmen will enjoy seniority rights under the new agreement and they will be furnished rubber coats by the company. The trainmen who have completed their runs will receive pay at the rate of time and one-half for all overtime. Every man who reports and is not assigned to a run will be credited with an allowance of 2½ hours' time.

During the suspension the employees asked for arbitration. This was refused by the company. Officials of the road insisted that a reduction in wages was essential if the road were to be able to operate on a paying basis.

### Pittsburgh Men Accept 10 per Cent Cut

On July 14 84 per cent of the platform men of the Pittsburgh (Pa.) Railways voted in favor of a 10 per cent cut in wages as recently proposed by the receivers. This announcement was made by P. J. McGrath, international vice-president of Amalgamated Association.

In accordance with the statement made recently by Charles A. Fagan, receiver of company, fares may soon return to the scale existing last May when wages were advanced from the scale prescribed in the agreement under which the employees are now working. Mr. Fagan's statement urged that if fares are to be reduced the cut should not be made until three months after the decreased wage scale was accepted as the increase in fares did not take effect until three months after the increase in wages.

Under the terms of the new scale the men now receive 54, 58 and 60 cents an hour instead of 64, 68 and 70 cents an hour as formerly. The new wage scale will be in effect for the next ten months or until May 21, 1922.

All other employees have also been reduced in pay.

### Strike as Protest Against One-Man Cars

Trainmen of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., struck a few days ago in protest against the operation of one-man cars in city service. The strike lasted three days, the men agreeing to return to work and operate the cars after Aug. 1, claiming that they had not had sufficient time in which properly to break in and become familiar with one-man operation. As the matter stands, they return to work under the same conditions as existed previous to the strike, except that the company has agreed to defer the operation of one-man cars for another two weeks to give the men an opportunity better to prepare themselves for one-man operation. The cars which are being used by the company in one-man operation are of the pay-as-you-enter type.

### Commission Has Reached No Finding

Many guesses have been made recently in the daily papers of New York City in regard to the probable recommendations of the new Transit Commission for solving the transit problem. According to Commissioner Harkness the statements so far made are unauthorized. On July 18 he said:

> The statements which have been made are entirely unauthorized by the commission, and in the opinion of the commission no good purpose is served by speculation as to what the commission is likely to do. Just as soon as it is possible to do so, the commission will make an official statement.

The published reports complained of were that the commission would seek to relieve the traction companies of all local taxes on the theory that this would make unnecessary any increase in fare.

### Wages of Suburban Men Cut

The New Jersey & Pennsylvania Traction Company, Trenton, N. J., has announced a reduction in wages for all employees to become effective on July 21. Failure to meet operating expenses and taxes and the long delay of the Public Service Commission of Pennsylvania in deciding the application for increased rates made necessary the reduction of wages. Under the new scale, motormen and conductors on double-truck cars will be cut 8 cents an hour. They now receive 50 cents. Operators of one-man cars will also be reduced 8 cents, from 55 to 47 cents. Office employees will also have to stand a cut.

### Engineers' Wages Fixed

The dispute between the Cincinnati (Ohio) Traction Company and its engineers which resulted in the latter going out on a strike recently and later the naming of an arbitration board to settle the difference has been brought to a close. The board has handed down an award naming the rates of pay for the men. The award made the rate of pay for the Pendleton and Depot Street Stations men 80 cents an hour and for the Chester Park and Hartwell Stations men, 75 cents an hour. The Chester Park and Hartwell men have been receiving 85 cents an hour and the Pendleton and Depot Street Stations men 90 cents an hour. The traction company had requested that the Chester Park and Hartwell men be reduced to 65 cents an hour and the Pendleton and Depot Street Stations men to 70 cents an hour.

### Service at Cost Proposed in Houston

Following the notification by the general manager of the Houston (Tex.) Electric Company that his company was ready to open negotiations with the City Council looking to the granting of a new franchise, City Attorney Sewell Myer has prepared a new ordinance recently read before the Council. The company has been operating under a temporary arrangement for some time. The new ordinance is along lines similar to the measure recently negotiated between the city and the Houston Lighting & Power Company.

As an incentive to economical management on the part of the company the ordinance provides that the company shall be permitted to earn ¼ to 1 per cent above the fixed return minimum when it reduces fares ½ cent. The company at the start will be permitted to charge a 7-cent fare for adults and a 3½-cent fare for school children.

### A., E. & C. Renews Contract

The employees of the Aurora, Elgin & Chicago Railroad, Wheaton, Ill., voted on July 12, 372 to 93, to accept the terms of a new contract which is practically a continuation of the one in effect during the past year. The only reduction in wages included is a change from 46 cents an hour to 40 cents and 35 cents for track labor. The old wages of 67 cents maximum on the third-rail division, 56 cents on the city lines, and 58 and 60 cents on the trolley interurban lines is continued.

The right is reserved to the receiver, however, to reopen the agreement on a thirty day notice at any time after Sept. 1.

The main difference in the new contract from the old one is that the company is relieved from paying time and one-half for that work in the nature of regular routine in keeping the roads running on Sundays and holidays. The small amount of labor required in this connection, will hereafter be paid for on straight time basis.

## $17,000 a Mile Offered by Municipal Line for Private Property

The Detroit Street Railway Commission has named $388,000 as the sum the city is willing to pay the Detroit United Railway for the parts of Fort Street and Woodward Avenue lines where franchises have expired. The company, on the other hand, has refused the offer as wholly inadequate.

According to the letter addressed to Vice-President Edwards of the Detroit United Railway, the report of the engineers indicated the condition of the tracks and pavement in a great many places was such as to compel the commission to consider the trackage as a liability rather than of value. It is necessary, the commission states, to rebuild the greater part of these lines.

The total trackage involved is approximately 23½ miles, making the price set by the city less than $17,000 per mile. The Detroit United Railway has contended that the type of construction on these lines cost approximately $100,000 per mile.

Mayor Couzens has announced that the next step will be to start ouster proceedings to force the Detroit United Railway to remove its tracks from Fort Street and Woodward Avenue unless the company's attitude is changed relative to the offer for these lines. Under the court ruling in the Fort Street case, the city can force the company to remove its tracks where franchises have expired, after having given ninety days' notice.

## Service-at-Cost Legislation Approved

Governor J. J. Blaine of Wisconsin has signed the Arnold bill empowering the city of Milwaukee to enter into a service-at-cost contract with the Milwaukee Electric Railway & Light Company for the operation of the company's city railway lines. Under the provisions of the bill, the contract must be negotiated by the Common Council, then approved by the Railroad Commission, and finally submitted to a referendum of the voters before becoming effective.

The bill was introduced at the request of the Milwaukee City Council following recommendations made by the public utilities acquisition committee, a commission appointed about a year ago to investigate the feasibility and desirability of municipal ownership of the electric railway and the electric light and power facilities of Milwaukee.

The bill is intended to empower the city of Milwaukee to carry out the recommendations which the public utilities acquisition committee is expected to make in a report to be submitted in the very near future. The bill provides for the usual service-at-cost agreement plus a feature which will make it possible for the city gradually to become the owner of the utility property. The company, under the proposed service-at-cost agreement, would be removed from the jurisdiction of the State Railroad Commission except in certain minor matters. Under the plan the city will also extend its credit to the company to finance extensions and improvements at a lower rate of interest than the company now has to pay.

## Interurbans Insist Upon 25 per Cent Wage Cut

For the first time in many years it appears that the Rochester & Syracuse Railway and the Empire State Railways, Syracuse, N. Y., are unwilling to follow the lead of the New York State Railways in regard to a wage agreement with their employees.

It was generally conceded that these two companies would agree to accept the decision of the New York State Railways and Amalgamated union arbitrators, that a reduction of 11.7 per cent from the wage scale in force prior to May 1 was the proper scale in view of the reduction in living costs. Officials of the Rochester & Syracuse Railway, however, stuck to their original proposition that the reduction would be 25 per cent retroactive from May 1.

Arbitration was accordingly resorted to and evidence submitted by both factions. The company contends that in view of the fact that many operatives live in communities where living costs have been reduced in greater proportion than in the cities the men can afford to accept a 25 per cent reduction. As the complete evidence for both sides has been submitted to the board, it is expected that a settlement will be made very shortly.

Facing a like situation, the Empire State Railways is making an attempt to settle the difficulty without arbitration.

# News Notes

**Wages Cut in Erie.**—The wages of employees of the Buffalo & Lake Erie Traction Company, Erie, Pa., were recently cut by a board of arbitrators. The cut amounts to 16⅔ per cent.

**Wage Cut in Reading.**—The Reading Transit & Light Company, Reading, Pa., has reduced the wages of its motormen and conductors 4 cents an hour. The maximum pay is now 50 cents an hour.

**Pay of Electrical Workers Cut.**—Electrical workers employed by the Toledo Railways & Light Company have approved a new wage contract taking a 20 per cent cut in wages, elimination of two weeks' vacation, and making the new scale retroactive to June 16. Nearly 450 men are affected by the cut. Platform men were cut 10 cents an hour recently.

**Boulder Watching Trackless Trolley.**—In view of extensive paving work being done in Boulder, Col., the Western Light & Power Company had considered the trackless trolley as a substitute. The substitution was found not to be possible in time to meet the requirements of the company so it is going ahead with its present system, but is watching closely the development of the trackless trolley.

**Coinage Legislation Unlikely.**—Indications are that the committee on coinage, weights and measures of the House of Representatives is thoroughly convinced that small coins in new size will make for needless expenditures on the part of electric railways and others using fare boxes or coin devices. As a consequence it is anticipated that no legislation along those lines is likely to be recommended at this session of Congress.

**Arbitrators Must Decide Wage Scale.**—An arbitration board will decide the wage controversy between the Auburn & Syracuse Railroad, Auburn, N. Y., and its union employees. This agreement was made after Lawrence Lippitt, acting manager of the road, and Henry Barrett, president of the union, had failed to reach a settlement. The men are seeking a nine-hour working day and 53 cents an hour for two-man cars and 58 cents for operators of one-man cars. The present wage scale is 45 cents an hour on all city lines and 47 cents on the interurban.

## Program of Meeting

### New England Street Railway Club

The annual outing of the New England Street Railway Club will be held on Thursday, July 28, at Mt. Tom, Holyoke, Mass. The start from Holyoke for Mt. Tom will be made at 10 a.m., daylight saving time. A stop will be made at 10:30 at Aldrich Lake. Here the annual ball game between the railway and supply members will be staged, and the silver-mounted bat presented to the winning side. Other sports will also be on the program. Luncheon will be served at 12:30. At 1:30 the party will leave Aldrich Lake for Mt. Park via Amherst, Hadley and Northampton. At 3 p.m. there will be a theater party, with high-class vaudeville by Keith's circuit players. At 5 p.m. the party will leave Mt. Park for the top of Mt. Tom via the inclined railway. Dinner will be served at 6 p.m. at the spacious summer house, more than 1,200 ft. above sea level. Those who desire hotel accommodations should make reservations direct to T. J. Behan, manager, Hotel Nonotuck, Holyoke, Mass. Special prices have been made by the hotel to those planning to attend the outing, and it is requested by the club that those who apply for reservations make it known that they are attending the club outing. Suitable arrangements have been made to take care of those who prefer to go to the outing in their own automobiles.

# Financial and Corporate

## Municipal Road Claims Profit

### $4,359 Net Said to Have Been Earned on a Five-Cent Fare Line on Staten Island

Grover A. Whalen, commissioner of plant and structures of New York City, on July 18 filed a report with the Board of Estimate and Apportionment on the operation by the city of the Staten Island Midland Railway for the period of seven months ended June 30, 1921. According to Mr. Whalen the report shows that the road has been operated successfully and profitably at a 5-cent fare. He explains that the conditions during the period of operation covered have by no means been ideal and that great difficulties have arisen at times. Nevertheless, according to him, operation has been covered by receipts, and a small profit has been made even above interest and depreciation for the period ended June 30, which included all the lean months of the year. It is Mr. Whalen's opinion that the full year of operating ending Nov. 30 will realize a very substantial profit above all costs of operation. He says:

> I have the honor to submit herewith a report of the operations, by this department, of the Staten Island Midland Railway under the agreement between the city and the receiver dated Nov. 5, 1920, for the period from Dec. 1, 1920, to June 30, 1921.
>
> The total revenue from operation during this period amounted to $205,604. Operating expenses, including maintenance, operation and administrative expenses amounted to $183,314, leaving a net balance after all operating expenses were paid of $22,289. Deducting the special franchise tax and tax on real estate used in operation of the road of $9,977 leaves a net operating revenue of $12,311.
>
> The exact determination of the interest charges on the moneys so far expended by the city for equipment cannot be made at this time. After consideration it was determined that interest at 5 per cent would be nearly correct in view of the interest due on daily balances, not yet determined, which on June 30 amounted to $24,120 exclusive of the revolving fund of $50,000, which has not yet been encroached upon in the payment of actual operating expenses. Deducting therefore an interest charge of $3,452 leaves a credit balance of $8,859.
>
> It is difficult to determine, at this time, what the exact depreciation will be on equipment now in use and now under purchase. Approximating, however, depreciation on equipment in use during this period, gives an amount of $4,500; which deducted from the previous balance leaves a final net balance of $4,359.
>
> Important items of cost entering into operation of this road have not yet been fully determined, but I am firmly of the opinion that when these costs are finally determined, there will be an additional credit balance to be added to the one above quoted for the period ended June 30.
>
> Revenues are increasing at a satisfactory rate, having increased from an average per day of $794 in December, to an average per day of $1,558 in July. The revenue from operation for the month of December was $24,631, while for the first thirteen days of July it amounted to $20,266.
>
> It should be pointed out that this period ended June 30 included the months of minimum revenue and maximum expense, namely, December, January and February and that it included only one month of real good business, namely, June, and that the five months still remaining in the operating year will include the months of maximum traffic, namely July and August, while September will be as good as June; October and November equivalent or better than April and May as the road will be better equipped to handle increased traffic during the five months to come.
>
> It is therefore firmly believed that at the conclusion of the operating year a substantial profit will have been earned from the operation of this road and that its division with the receiver under the agreement will make available substantial sums to cover the cost of rental for the use of the company's property.
>
> Substantial sums have also been expended in the improvement of the road in accordance with paragraph of the agreement. It should also be stated at this time that if the city was generating its own power further substantial earning would, it is firmly believed, have been made.
>
> Certain facts are to be borne in mind in connection with this operation, namely:
>
> That the city has given better service on these lines than was ever given under private ownership and operation.
>
> That the resumption of service on these trolley lines has made areas of Richmond Borough accessible, has stimulated development, resulting in the erection of additional buildings and helping to solve the city's housing problem.

## Good Year for Municipal Railway

The receipts for the San Francisco Municipal Railway Lines for the year ended June 30, 1921, were $2,900,636, an increase of 6.3 per cent over the earnings for the previous year. Operating expenses approximate $2,090,000, an increase of about 3 per cent. The net operating revenue shows an increase of about 18 per cent. The amount set aside for depreciation will aggregate about $550,000, which is the largest in the history of the road. Bond payments are made out of the depreciation reserves and already $900,000 bonds have been redeemed since the road commenced operation. The net revenue will more than pay interest on bonds and transfers, leaving a surplus for the year's operations.

## Gross Increase 17 per Cent

### 339 Roads Earned $943,996,914 Gross in 1920, an Increase of $136,831,929 Over 1919

The annual compilation of the gross and net earnings of the electric railways of the United States, made by the *Commercial & Financial Chronicle*, appears in the issue of that paper for July 9. The figures on gross are made up from the reports of 333 roads, making returns for the calendar year 1920 and 1919, and for six roads reporting for the fiscal year ended June 30. The figures on net are for the same roads except for five roads, mostly small properties, whose net was not reported. In these cases the same operating ratio was assumed as for the other properties reporting for the same period. The figures as given by the *Chronicle* for the past seventeen years follow. In commenting on these figures the *Chronicle* says:

> The fact that notwithstanding the heavy augmentation in expense (labor and coal were considerably higher for the greater part of the year than in 1919) net earnings registered some improvement over the previous year, moderate though it be, cannot be regarded as otherwise than encouraging.

Attention is also called to the fact that the increase in gross does not necessarily indicate a growth in traffic, but it undoubtedly reflects increases in fares. The *Chronicle* also points out that the tables do not indicate the aggregate of the gross and net earnings of all of the street and electric railway undertakings in the country. They simply make use of all the figures at hand, and there are many companies, including some large properties, whose figures are not available. In some cases also, the figures include the receipts from the sale of electricity for lighting and power, but where it has been possible to separate the figures, the railway figures only have been used.

GROSS EARNINGS OF ROADS REPORTING TO "CHRONICLE"

| Period— | Current Year | Previous Year | Increase | Per Cent |
|---|---|---|---|---|
| 1905 compared with 1904 | $306,067,145 | $281,608,936 | $24,458,209 | 8.68 |
| 1906 compared with 1905 | 300,567,453 | 269,595,551 | 30,971,902 | 11.49 |
| 1907 compared with 1906 | 306,266,315 | 280,139,044 | 26,127,271 | 9.33 |
| 1908 compared with 1907 | 351,402,164 | 348,137,240 | 3,264,924 | 0.94 |
| 1909 compared with 1908 | 374,305,027 | 345,006,370 | 29,298,657 | 7.49 |
| 1910 compared with 1909 | 435,461,232 | 405,010,045 | 30,451,187 | 7.51 |
| 1911 compared with 1910 | 455,746,306 | 428,631,259 | 27,115,047 | 6.33 |
| 1912 compared with 1911 | 486,225,094 | 457,146,070 | 29,079,024 | 6.36 |
| 1913 compared with 1912 | 529,997,522 | 500,252,430 | 29,745,092 | 5.94 |
| 1914 compared with 1913 | 553,095,464 | 548,296,520 | 4,798,944 | 0.87 |
| 1915 compared with 1914 | 567,901,652 | 569,471,260 | *1,569,608 | 0.28 |
| 1916 compared with 1915 | 626,840,449 | 574,382,899 | 52,457,550 | 9.13 |
| 1917 compared with 1916 | 670,309,709 | 618,529,309 | 51,780,400 | 8.37 |
| 1918 compared with 1917 | 696,066,585 | 649,550,990 | 46,515,595 | 7.16 |
| 1919 compared with 1918 | 783,514,781 | 663,572,571 | 119,942,210 | 18.08 |
| 1920 compared with 1919 | 943,996,914 | 807,164,985 | 136,831,929 | 16.95 |

NET EARNINGS OF ROADS REPORTING TO "CHRONICLE"

| Period— | Current Year | Previous Year | Increase | Per Cent |
|---|---|---|---|---|
| 1905 compared with 1904 | $130,884,923 | $118,221,741 | $12,663,182 | 10.71 |
| 1906 compared with 1905 | 126,580,195 | 114,024,076 | 12,556,119 | 11.01 |
| 1907 compared with 1906 | 126,002,304 | 121,050,703 | 4,951,601 | 4.09 |
| 1908 compared with 1907 | 142,262,417 | 141,144,213 | 1,118,204 | 0.79 |
| 1909 compared with 1908 | 160,394,765 | 140,647,906 | 19,746,859 | 14.03 |
| 1910 compared with 1909 | 178,037,379 | 167,100,351 | 10,937,028 | 6.54 |
| 1911 compared with 1910 | 186,001,439 | 175,527,542 | 10,473,897 | 5.96 |
| 1912 compared with 1911 | 194,309,873 | 179,915,760 | 14,394,113 | 8.00 |
| 1913 compared with 1912 | 204,422,429 | 193,393,045 | 11,029,384 | 5.70 |
| 1914 compared with 1913 | 211,020,088 | 212,146,403 | *1,126,315 | 0.53 |
| 1915 compared with 1914 | 214,319,303 | 217,440,533 | *3,121,230 | 1.43 |
| 1916 compared with 1915 | 234,402,450 | 215,917,573 | 18,484,877 | 8.56 |
| 1917 compared with 1916 | 221,090,740 | 228,585,929 | *7,495,189 | 3.28 |
| 1918 compared with 1917 | 178,226,716 | 212,570,930 | *34,344,214 | 16.16 |
| 1919 compared with 1918 | 185,077,301 | 168,770,930 | 16,306,371 | 9.66 |
| 1920 compared with 1919 | 192,360,849 | 186,248,269 | 6,112,580 | 3.28 |

* Decrease.

# $550,253 Earned by Boston Elevated

## Ten-Cent Fare Gradually Making Headway Against Accumulated Deficit of $5,415,500—Five-Cent Lines an Experiment

**Operating receipts of the Boston (Mass.) Elevated Railway for the year just closed, the third of public control, exceeded the costs of operation by $550,253. This has made it possible to pay off the deficit of $435,348 carried over from the first year of operation and to leave a balance of $114,905. This added to the balance of last year makes a total of $131,985 as the first payment made in restoration of the reserve fund.**

THESE results have been obtained without impairment of the service or interruption in the five-year program originally adopted for reconstruction of track, replacement of obsolete and worn out rolling stock and improvement of power plant. The financial history of operations during the three years is shown in the accompanying table.

In July, 1919, at the end of the first year of public management the operating receipts under a 5-, then a 7- and finally an 8-cent fare had failed to meet the operating costs of the year by $5,415,500. Of this amount $3,980,151 was assessed, as provided by law, upon the cities and towns served by the railways. Of the remaining amount $1,000,000 was met from the reserve fund established under the statute, which was thereby exhausted. The balance of $435,348, representing an increase in wages applicable to May and June under a retroactive award in the latter part of July, could not be made a part of the deficit assessed upon these communities.

In July, 1920, at the end of the second year of public control operating receipts under a 10-cent fare, which had been put in force at the beginning of the year, had exceeded operating costs for the year by $17,079.

The trustees say that the attempt to answer the question as to reduction of the 10-cent fare finds as the first barrier the provision of law which requires the restoration to the exhausted reserve fund of $1,000,000, and the repayment to cities and towns of the $3,980,151 advanced by them to meet the deficit of 1919 before any reduction can be made in that fare. This means that several years may elapse before the excess of receipts over expenditures can be applied in lessening the cost of transportation to the car rider, unless the relation between the rider and the taxpayer is readjusted by some legislative action. A statement of the situation will appear as a part of the annual report of the trustees to be filed at the State House in January.

In commenting on the introduction of the 5-cent fare for short-haul riders the trustees say this is still an experiment and may remain such for a considerable time. If a reasonable test proves that either singly or collectively this limited cheap service invades or seriously threatens an invasion of the net revenue of the railway the trustees will be forced by the statute to advance the local fare or abandon the experiment. The trustees say:

> The paramount requirement under the Statute for the operation of this railway upon its theory of a service-at-cost is the necessity for securing and preserving a revenue that will maintain it upon a self supporting basis. This is the all important consideration both as a matter of law and of common sense. If in the test of this local cheap and limited service it is found that the net revenue of the system is materially invaded through competition with the 10-cent fare, the experiment fails. Nor can this service be permitted to continue if it interferes with or delays an otherwise possible reduction of the basic flat fare for travel throughout the system.
>
> The outcome is as yet problematical. Even though the experiment does not add enough in the way of new patronage to increase net revenue, if its effect is to restore lost patronage without imposing any substantial burden upon those who use the rest of the system this result might well justify the continuance of the service as one that increases the usefulness of the railway, a most important reason for its existence.

ACTUAL RECEIPTS AND COST OF SERVICE OF BOSTON ELEVATED RAILWAY DURING THREE YEARS OF PUBLIC CONTROL

| RECEIPTS | Year Ended June 30, 1921 | Year Ended June 30, 1920 | Year Ended June 30, 1919 |
|---|---|---|---|
| From fares | $33,122,199 | $31,899,320 | $24,472,430 |
| From operation of special cars, mail pouch service, express and service cars | 88,519 | 105,554 | 115,624 |
| From advertising in cars, on transfers, privileges at stations, etc | 303,047 | 297,037 | 293,079 |
| From other railway companies for their use of tracks and facilities | 30,024 | 47,637 | 48,815 |
| From rent of land and buildings | 115,809 | 87,259 | 73,099 |
| From sale of power, etc | 121,566 | 115,188 | 125,534 |
| Total "receipts" from direct operation of the road | $33,781,164 | $32,551,994 | $25,128,581 |
| Interest on deposits, income from securities, etc | 419,122 | 119,521 | 96,994 |
| Total receipts | $34,200,286 | $32,671,515 | $25,225,575 |
| Profit and loss, delayed items | 23,863 | 17,685 | *2,080 |
| | $34,224,149 | $32,689,200 | $25,223,495 |
| COST OF SERVICE | | | |
| Operating expenses: | | | |
| Maintaining track, line equipment and buildings | $2,516,331 | $3,524,507 | $3,583,057 |
| Maintaining cars, shop equipment, etc | 2,857,115 | 2,736,249 | 2,519,485 |
| Power | 3,390,704 | 2,930,268 | 2,809,632 |
| Depreciation | 2,004,000 | 2,004,000 | 2,004,000 |
| Transportation expenses | 11,506,157 | 10,781,788 | 9,293,160 |
| Salaries of administrative officers | 79,749 | 83,761 | 94,060 |
| Law expenses, injuries and damages, and insurance | 1,158,094 | 1,107,005 | 1,162,547 |
| Other general expenses | 1,106,881 | 963,643 | 896,232 |
| Back pay | 65,527 | 200,000 | .......... |
| Total operating expenses | $24,684,558 | $24,331,221 | $22,362,171 |
| Taxes—Federal, State and Municipal | $1,306,736 | $1,075,497 | $941,612 |
| Rent for leased roads | 2,673,166 | 2,607,566 | 2,587,130 |
| Proportion of rent of subways and tunnels, paid to the city of Boston | 1,543,324 | 1,531,474 | 1,491,999 |
| Proportion of rent of Cambridge Subway, paid to Commonwealth of Massachusetts | 404,639 | 59,850 | .......... |
| Interest on Boston Elevated bonds, notes and bills | 1,483,625 | 1,593,258 | 1,423,143 |
| Miscellaneous items | 54,479 | 69,285 | 37,373 |
| Proportion of dividend rental under acts of 1918 | 1,523,367 | 1,403,970 | 1,360,220 |
| Total cost of service | $33,673,896 | $32,672,120 | $30,203,647 |
| Net profit or loss | 550,253 | 17,079 | *4,980,151 |
| Back pay applying to May and June, 1919, which had not been determined at time deficit was assessed | .......... | .......... | *435,349 |
| | | | *$5,415,500 |
| Revenue passengers carried | 337,381,994 | 324,192,374 | 331,348,124 |

* Figures in italics denote deductions or deficits.

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## West End Lines at Pittsburgh May Be Foreclosed

Judge Charles P. Orr of the United States Court on July 14 granted all contentions of the Union Trust Company in the two-year-old litigation of the $4,000,000 debt of the Pittsburgh Railways subsidiary matured by interest default. This judgment was on a mortagage held against the Pittsburgh & West End Passenger Railway and included foreclosure proceedings against lines operating mainly through the West End. It was granted in favor of the Union Trust Company, Pittsburgh. Unless appeal from the decision is taken these lines will probably be sold next September or October to satisfy the mortgage. The receivers of the Pittsburgh Railways state no appeal will be made.

The Union Trust Company is trustee under a mortgage executed by the Southern Traction Company to secure bonds under a mortgage dated Oct. 1, 1900. The name of the mortgagor later was changed to the Pittsburgh Railways. The mortgage was given to secure payment of $4,000,000 within fifty years from Oct. 1, 1900, with interest at 5 per cent per annum, payable semi-annually.

The mortgage contains a provision that in case of default in the payment of interest for a period of thirty days the whole principal sum of bonds secured by the mortgage forthwith becomes due and payable. The railways defaulted in the payment of interest due on Oct. 1, 1918, after which the Union Trust Company declared the principal due. Suit was instituted two years ago for permission to foreclose on the mortgage at that time. Judge Orr granted the company the right to enter foreclosure proceedings. An answer was filed by the railways and the decree on July 14 is the decision of the court.

## Bill Permitting Track Abandonment Vetoed

Governor J. J. Blaine of Wisconsin has vetoed the Morris Bill authorizing the Wisconsin Railroad Commission to permit electric railways, city or interurban, to abandon portions of their line which they could show were being operated at a loss.

In vetoing the bill Governor Blaine is reported to have said in part:

> An interurban or suburban street railway under our law is entitled to a fare that is reasonably compensatory. Suburban communities have been established in and about the larger cities, and the city together with those communities constitute an area that should be served by the transportation companies operating within that area. In considering the rates of fare, therefore, the area should and is taken into consideration in fixing a reasonable compensation, or fare.
>
> Theoretically, there can be no loss to the utility under the law, and it is for the Railroad Commission, and then in the courts, to establish a rate that will give the utility a reasonable return. Large communities have been built up around the larger cities, and people have been induced to purchase property and make improvements and establish municipal government, and in fact large investments have been made by individuals and municipalities, inducements for which was in the first instance the presence of transportation company furnishing a convenient service to the city of which such communities are suburbs. Sound public policy can not justify the possibility of the abandonment of a suburban electric line, under the conditions I have described.

## City Will Value Ottawa Electric Railway

At the request of the City Council of Ottawa, Ont., the Hydro-Electric Power Commission of Ontario will value the property of the Ottawa Electric Railway. T. U. Fairlie, head of the railway and bridge department of the commission, is to undertake the work. Mayor Plant has announced that Mr. Fairlie will, in all probability, make two separate and distinct valuations of the property.

The first valuation will be based on the original cost of the road less depreciation, and the second one will be a valuation based on the cost of reproduction of the road at the present time, less depreciation.

## Another Electric Line Emerges from Receivership

The Denver & Interurban Railroad, operating from Denver, Col., to Boulder and Eldorado Springs, has emerged from the receivership brought about in 1918 by the conditions of government control of the railroads.

The Denver & Interurban Railroad is a subsidiary of the Colorado & Southern, but when the government took over the Colorado & Southern, along with other railroad lines, the electric line was not taken over, but was thrown on its own resources.

Then followed suit for defaulted interest by the holders of the bonds, resulting in the appointment by Federal Judge Robert E. Lewis of W. H. Edmunds, manager, as receiver.

Under the federal receivership the fares were increased to compare with the rates on steam lines to the same points. This enabled the company to better its earnings. With the return of the railroads to private ownership, the Colorado & Southern was enabled to resume its former guardianship of the electric line, hence the discharge of the receiver and the return of the property to its owners.

Mr. Edmunds, discharged as receiver, will continue to operate the property under his former title of manager.

## Eureka Votes to Buy Railway

By practically a unanimous vote of the people on June 20 the city of Eureka, Cal., has been authorized to issue bonds for the purchase of the Humboldt Transit Company, which operates in that city. Railroad Commissioner Loveland recently brought out the fact that the testimony of the chief engineer and the general manager of the property agreed in the opinion that not even operating expenses could be made in the future, and that if the city should decide not to buy the railway, service would have to be discontinued and the property scrapped. The Railroad Commission valued the property at $100,000, but the attorney for the Humboldt National Bank, which represents the bondholders of the railway, announced later that the bank had been authorized to submit $75,000 as the valuation of the lines.

## Twin City Finances May Be Readjusted

As part of the plan for complete financial readjustment of the Twin City Rapid Transit Company and its subsidiaries, the Minneapolis Street Railway and the St. Paul City Railway, the company will ask permission from the Minnesota Railroad & Warehouse Commission to sell $3,300,000 of new securities. Of this amount $1,730,000 will be utilized for reconstruction and paving ordered in St. Paul and $84,370 for extensions; $991,750 for reconstruction in Minneapolis and $528,970 for extensions.

Horace Lowry, president of the company, says the financial rearrangements will be brought before the commission when that body is asked to make a complete valuation of Twin City Rapid Transit properties subsequent to action on the application for a temporary fare increase made to the commission on June 21 and now pending.

Mr. Lowry said:

> There is no mystery in the relationship between these two companies. Financially they touch at two points. The Twin City Rapid Transit Company owns all the capital stock of each company, $5,000,000 in each case. This is one point. The other is a $10,000,000 bond issue which will mature in 1928 and which constitutes a mortgage on the property of both the Minneapolis Street Railway and the St. Paul City Railway.

He said he was unable to answer a question as to whether the Twin City Rapid Transit Company might be liquidated, or another as to whether the present holding company and its two twin city subsidiaries might be integrated, as a single corporation.

# Financial News Notes

**Interest Defaulted at Des Moines.**—Interest due on July 1 on the $4,821,000 of general and refunded mortgage 5-per cent bonds of the Des Moines (Ia.) City Railway having been defaulted, the holders have been requested by the committee to deposit their bonds with the Harris Trust & Savings Bank, Chicago.

**P. R. T. Earns $191,561 in June.**—For the first six months of 1921 the Philadelphia (Pa.) Rapid Transit Company reports a net income of $1,016,408 against $354,970 for the same period a year ago. Out of this amount a 5 per cent return on P. R. T. capital is to be met. The deficit has been reduced from $1,117,935 as of Dec. 31, 1920, to $851,526 for the eighteen months' period to June 30, 1921.

**Receiver Asked for Municipal Road.**—The Taunton Coal Company at Taunton, Mass., has asked for the appointment of a receiver for the municipally-owned Norton, Taunton & Attleboro Street Railway. The coal company alleges that the road owes it $4,294 in payment for coal purchased. The railway is owned by the cities of Attleboro and Taunton and by the towns of Sandfield and Norton. The board of directors is composed of representatives of the four municipalities. The president of the road is Mayor Leo H. Coughlin of Taunton.

**Minneapolis Seeks Valuation Expert.**—Although deadlocked through 150 ballots on organization of the new City Council the likelihood is that the conservatives and the radicals in the City Council of Minneapolis, Minn., will unite on the selection of an expert for the valuation of the property of the railway. They have asked the city attorney to write several experts who have proferred their services for the work. A socialist Alderman has moved for a test of the law which puts the rate-making power into the hands of the State Railroad & Warehouse Commission and this motion will be considered in a committee of the whole.

**Deficit Being Piled Up in Memphis.**—The gross income of the Memphis (Tenn.) Street Railway for June was $17,508 below the income for June of a year ago. The month's operations added $15,056 to the deficit, which has been piling up since July 1, 1919, bringing the accumulated deficit to $179,759. More than 930,000 fewer passengers were carried than during June, 1920. For June the gross income was $251,724 as compared with $269,232 for the same month last year. Operating expenses were reduced from $177,823 last year to $156,638 for June this year. The total cost of the service for the month was $266,780. For June, 1920, it was $287,402.

# Traffic and Transportation

## Mayor Promises Relief from Jitneys

Mayor Charles W. Jewett has issued a statement pronouncing himself in favor of legislation by the City Council designed to eliminate the jitney bus as a competitor of the Indianapolis Street Railway.

His statement was issued after he had received a copy of a letter sent by Dr. Henry Jameson, chairman of the board of the railway, to Russell Willson, president of the City Council, saying that the company's loss of revenue as a result of the operation of jitney buses has made imperative the need of a city ordinance to regulate the jitneys. Dr. Jameson said railway service on certain streets of the city must be abandoned or the fares increased if an effective jitney bus ordinance is not enacted.

The Mayor said in part:

> The regulation of jitneys is purely a legislative matter, and the power to curb jitney bus business rests solely with the Common Council. However, I am of the opinion that jitney bus business is a serious menace to our railway, and if the Council will pass stringent laws prohibiting the activities of the jitney buses in competition with the street car company, I will sign the ordinance. Unless the jitney bus is eliminated, irreparable harm will come to the city through the destruction of our transportation system. I am opposed to an increased fare above 5 cents.

Dr. Jameson said the number of jitneys operating in the city has increased steadily the last few weeks until now the number is more than 600. These, he said, carry an average of 20,000 passengers a day.

Mr. Willson said that he did not believe the city should take steps granting to the company the requested relief from jitneys until it is seen what attitude the company will take toward the city administration in regard to the proposed new franchise ordinance.

## Company Wins Fight for Ten-Cent Fare

By a recent ruling of the Public Service Commission the Buffalo & Lackawanna Traction Company, Buffalo, N. Y., which has the franchise for the line operated by the Buffalo & Lake Erie Traction Company, Erie, Pa., through the south side of Buffalo, has been authorized to charge a 10-cent fare without transfers.

Under franchise provisions the railway was limited to a 5-cent fare and was required to issue tranfers on the lines of the International Railway and to accept transfers from that line. One result of the decision is that passengers on the Buffalo & Lake Erie line and those who transfer to the International Railway will have to pay 17 cents or 16½ cents ticket rate.

Colonel Pooley, the Buffalo member of the commission, said in his finding that it was absolutely impossible for the company to make operating expenses on a 5-cent rate. Under a decision of the court of appeals the commission lacked the power to declare these franchise provisions null, but under the reorganization act the commission was able to effect these changes.

## Washington Rates Debated

### Civic Associations Making Determined Stand in Fare Reduction—Each Company Should Stand Alone

Unusual interest was manifested in the hearings conducted by the Public Utility Commissioners of the District of Columbia in the matter of railway fares. The hearing was characterized by a very determined drive on the part of the citizens' associations looking to a material reduction in rates. One of the contentions of the Washington Railway & Electric Company, which owns the Potomac Electric Power Company, was that the fare on its cars could be reduced to 7 cents if the commission would permit an increase in electric light rates from 8½ to 10 cents a kilowatt-hour.

The contention of the Capital Traction Company was that a 6-cent fare would give that company a return of 6.32 per cent on its investment. That company contended that each company should stand alone, and that the Washington Railway & Electric Company should be allowed such rate of fare as was justified regardless of what might be justifiable for the Capital Traction Company.

The proposal to establish zones outside of which an extra fare would be collected is being combated vigorously by the citizens' associations on the ground that it would discourage suburban development and make for greater congestion in the first zone. It also was contended that suburbs had been developed on the understanding that there would be one fare within the District of Columbia.

## No Funds for Rerouting

Plans for extensive rerouting of railway lines in downtown Indianapolis, involving an expenditure of from $50,000 to $60,000, were outlined at a conference recently of the City Council committee on rerouting and its subcommittee. The chief feature of the scheme would require some cars to be routed around the eight block loop downtown while others would be turned on a series of smaller loops, touching the main loop at some point.

Officers of the Indianapolis Street Railway have informed city officials that no plan of rerouting which would involve the expenditure of money could be carried out by the company until its financial condition is improved.

## Motor Bus Men Offer to Furnish Service

The Des Moines Motor Bus Association made a proposal to the City Council during the week ended July 16 for giving the city transportation service in the event of suspension of service by the Des Moines City Railway. In brief the proposal is as follows:

> That the City Council grant to motor bus operators five-year permits to operate, subject to city service and routes.
>
> That the license be granted on a line-company unit plan under which a single organization would be held responsible for service on each passenger route of travel.
>
> That bus companies with preferred lines be forced to provide service on lines that are not so profitable.
>
> That the basic fare be 5 cents.
>
> That free transfers be issued, if operating experience shows that they can be given profitably; if not a 1- or 2-cent transfer charge.
>
> That 200 buses be provided within a reasonable time after car service is suspended and 250 if it is discovered that that number is needed to handle the rush-hour service.
>
> That owl service be supplied at a 10-cent fare.
>
> That power be reserved by the Council to suspend permits for failure to perform.

Consolidation of all bus companies would be the ultimate object, but at first the Council is asked to grant permits on a line-company unit. This will exclude individual owners.

In order to give the Council power to provide service on lean lines the bus men propose that in securing permits to operate on heavy lines the operators must guarantee to take over certain lean lines.

The bus men propose to accept a tax considerably higher than the present one, namely, $25, but that they will oppose a wheel tax. Rather than jeopardize their entire offer, however, they are willing to accept a wheel tax.

No guarantee of service is offered except the right reserved to the City Council to revoke permits in the event of unsatisfactory service.

No action was taken by the Council on the offer other than to receive and file it. The proposition probably will not receive serious consideration until something definite is worked out in connection with the service-at-cost plan submitted by the railway men's union.

## Buses Active in Toledo

A dozen applications to operate motor buses under Toledo's new bus regulatory ordinance were taken out after court efforts of the busmen's organization failed to get a review of the case before the Supreme Court.

The city won its fight in the lower courts against the buses. The police were ready to enforce the ordinance on July 13.

According to the plan of regulation bus owners were forced to take out licenses both for their machines and drivers and then post indemnity bonds or insurance. They had to file routes and schedules with the safety director and have his approval.

Several chose to operate parallel to railway lines, but the congestion of traffic on St. Clair Street forced them to leave their favorite loading places. It is thought many will be driven to operate new lines.

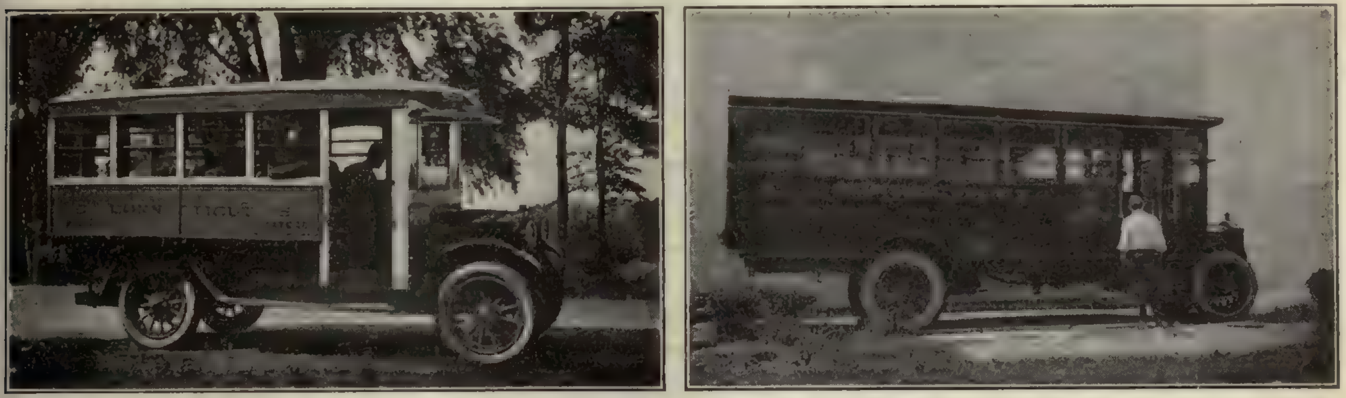
# Connecticut Jitney Developments

## Bridgeport Jitneys Greatly Reduced in Number—Railway Must Make Good—Legal Fight on Company—Connecticut Company Starts Bus Operation

Jitney events in Connecticut have been fast and furious the past ten days. Bridgeport has been denied most of her jitneys, the jitneymen have attacked the constitutionality of the new law, the insurance companies have taken a hand, and the Connecticut Company has started bus operation.

In one of the last orders which it issued before the new law became effective on July 15 the Connecticut Public Utilities Commission ruled all but seventy-one jitneys off the streets of Bridgeport. Eight routes, including four suburban, have received permits to continue in operation, utilizing seventeen fewer buses than were recommended by the Common Council to the commission. About a year ago Bridgeport was trolleyless. Under the commission ruling Bridgeport will now become practically jitneyless.

In its report the commission calls attention to the fact that the jitney problem in Bridgeport was more complicated than in any other section of the State.



REO AND PACKARD BUSES IN THE SERVICE OF THE CONNECTICUT COMPANY

The commission points out that the inadequacy of the trolley service occasioned the large development of jitney service. It finds the necessity for trolley service in Bridgeport to be without question, but says that the operation of jitneys in Bridgeport exists to an extent not only to prevent the successful operation of the trolley, but to jeopardize the successful operation of the jitneys themselves by reason of the excessive competition.

In speaking of the routes which have been approved for operation, the commission says that "while in many instances these routes parallel street railway tracks over portions of the way, they supply a necessary service from such territory into the center of the city."

In denying the right to operate over certain roads, the commission finds that the street railway tracks and facilities are sufficient and that the company claims to be willing and able to increase its service and to supply adequate service to care for the traffic.

In some cases where the routes compete directly with the steam railroad as between Bridgeport and Norwalk, also connected by trolley, the commission denied applications.

In analyzing and passing upon the Bridgeport situation, the commission feels that the number of routes should be limited and that it is better at the present time to have too few routes and add to them later if it becomes necessary than to make the mistake of approving unnecessary routes and later find that such routes should be discontinued. An opportunity has been afforded the railway to fulfill its charter obligations and to demonstrate its ability to supply adequate service.

### Validity of Jitney Law Attacked

An attack on the constitutionality of the jitney law has been launched in Hartford in behalf of Edward P. French of New Britain, whose petition for five jitney routes in that city was denied by the Public Utilities Commission. In New Haven the jitney bus owners banded together and appeared before Judge John E. Keeler in the Superior Court in Bridgeport and asked for a temporary injunction restraining the city of New Haven, the State of Connecticut, the Connecticut Company, and other municipalities from interfering with the operation of jitneys over routes heretofore operated. In both places it is contended that the law runs contrary to the Fourteenth Amendment of the Federal Constitution and that the public convenience and necessity are served by the existing jitney routes, etc. As far as the commission is concerned, Chairman R. T. Higgins said that the decision would stand until the courts decide whether or not the law is constitutional or find errors in individual cases. An error in an individual case would affect only the individual concerned. If the courts decide against the jitneymen a test case will probably be carried to the Supreme Court, but whether the law would be in force meanwhile is in doubt. But there is another law—the general motor vehicle law—to be considered. This law states specifically that the motor vehicle commissioner shall not license any jitney car until the latter has secured a certificate from the utilities commission; it also renders futile any appeal to the courts for release.

As a further deterrent to jitney operators, it is understood that various insurance companies have notified them that they cannot continue to carry liability insurance on any public service vehicle which does not have the certificate from the utilities commission if it is a jitney, and the correct license and marker under the vehicle law in any case.

Following the restrictions of motor buses which created certain gaps in transportation service the Connecticut Company, under its new authority, placed several buses in operation on Friday, July 15.

The service instituted is as follows:

1. From East Haven to and through Branford. This is a cut-off, as the company has a rail route from New Haven to East Haven to Branford, which follows the shore of Long Island Sound between the last two cities.
2. From New Haven through Milford to Devon. This is also a cut-off on that part of the New-Haven-Bridgeport line that follows the shore from New Haven, through Milford to Devon.
3. A suburban route near Danielson, in northeastern Connecticut, to serve a section formerly unserved.
4. From Atlantic Square, Stamford, to Glenbrook.

On all routes the same fare is charged on the bus as on the car between the same points and transfers are issued to and from the buses. Schedules are arranged for buses and trolleys to meet.

On routes 1 and 3 the buses used are Reo chassis with Paterson twelve-seat bodies; on route 2 Packard chassis and Paterson twenty-seven-seat bodies.

As to how far the Connecticut Company will ultimately develop its bus service it is too early to state.

The company did some excellent work to provide the service at the time the jitney restrictions became effective, purchasing chassis, driving them to Paterson, N. J., having them fitted with bodies, getting them back to Connecticut in some forty-eight hours, painting them, licensing them, insuring, lettering and numbering them and having them in service a few hours later.

### Another Survey and Valuation at New Orleans

The Commission Council of New Orleans, La., has yielded to the request of Commissioner Maloney, of the Department of Public Utilities, and has engaged F. W. Ballard, consulting engineer, Cleveland, Ohio, to make another survey and valuation of the property of the New Orleans Railway & Light Company. This is an admission on the part of members of the Council, after the frank avowal of Commissioner Maloney, that they are unequal to the task, due to inexperience, of passing satisfactorily upon the merits and demerits of the vexatious railway problem of the Crescent City.

Mr. Ballard's previous valuation, the lowest of several estimates submitted under the old city administration, was $32,000,000. His new valuation, it is assumed, will be in excess of his previous estimate. This belief is based upon a communication written quite recently by Mr. Ballard in which he declared in effect that intangible assets of public utilities should be considered where valuation, strictly speaking, was an issue.

While Mr. Ballard made no reference to the New Orleans Traction Company's valuation in his letters, it is known that these intangible assets were not included in his previous estimate of the worth of the property of the New Orleans Railway & Light Company. The decisions of the courts bear out this view in recent litigation affecting the value of public utilities.

Mr. Ballard's duties as a utility expert will be to assist the city authorities in their consideration of the various plans submitted looking to an adjustment of the pending troubles, for the purpose of reaching an amicable settlement without recourse to the courts. He will also act as the city's expert representative in preparing the case instituted by the city and now pending in the Federal District Court against the railways to restrain the collection of an 8-cent fare.

### Three Cheers for Fifth Avenue Bus

The splendid co-operation and generosity of the Fifth Avenue Coach Company, New York, N. Y., in the work of making wounded soldiers' lives a little brighter is told by Alfred C. Bennett, a member of the Committee for the Sick and Wounded Soldiers, American Legion Air Service, Post 501, who called upon various organizations to assist in extending free pleasures to the men. On June 7 a bus with three attendants called at the Polyclinic Hospital, 50th Street and Ninth Avenue, took the men to the Polo Grounds, where they witnessed the base-ball game, and waited to transport the men back to the hospital. Mr. Bennett said that he asked the company for free transportation for the men once a month, but that the company informed him a bus would call once a week, suggesting that it would therefore take less time to go the rounds. The management informed Mr. Bennett further that it was a rare opportunity for the bus company to do something to bring cheer to the wounded men and to co-operate in a worthy work of this kind.

### Louisville Decision Expected Soon

The Federal Circuit Court of Appeals is expected to render a decision soon in the case of the City of Louisville against the Louisville Railway. News to this effect has developed the evil of speculation in receipts issued by the company for the extra fare collected under the order of the injunction granted by Federal Judge Evans. This order restrained the city from interfering with the collection of a 7-cent fare which the company obtained last February.

Five tickets to a strip are sold for 35 cents. In the event the city wins its case the receipts attached to the strips will be worth 10 cents. The "market" price of the receipts now stands at 1 cent for five receipts. Few "sales" are reported, however, as citizens holding receipts seem to be confident that the city will win. Those who think the company will win did not bother about saving their receipts.

The decision of the Circuit Court of Appeals, however, is regarded by both sides in the case as a mere formality to be observed in bringing the case before the United States Supreme Court. Both parties have announced their intention to appeal.

### Buses Bridge Traction Gap

The 30-mile gap in traction service between Louisville and the Bluegrass section of Kentucky has been bridged by the Capitol Motor Coach Transit Company, which has established a motorbus line between Shelbyville, 30 miles east of Louisville, and Frankfort, which is 60 miles east of Louisville. Three round trips are made daily by the buses of the company. Stops are made at all points between the two cities. The establishment of the bus line connects Louisville and Shelbyville on the west with Frankfort, Lexington, Nicholasville, Georgetown and Paris on the east.

### Ambiguities Removed

The Ontario Legislature, in order to remove doubts as to the meaning of a paragraph relating to the "award, conditions, tender and bylaw" in the agreement between the City Council of Toronto and the Toronto Railway, has passed an act declaring that the value of the company's real and personal property to be taken over by the city shall be determined by three arbitrators, as provided in the Municipal Act, secs. 335 and 336. Sir Adam Beck has been appointed by the City Council, and Sir Thomas White by the company, and Hume Cronyn, M.P., of London, Ont., has been chosen by them as the third arbitrator.

### City Seeks to Compel Fare Reduction

Suit to compel the Cincinnati (Ohio) Traction Company to publish a reduction in fares from the present rate of 8½ cents to 8 cents on Aug 1 has been filed in the Superior Court by Saul Zielonka, city solicitor. The city will base its plea on the purported agreement made by the company on July 14 to abide by an ordinance passed a month before, amending the service-at-cost franchise.

According to the petition the gross receipts of the company during the months of May and June have been in excess of the amount needed to meet payments and accruals and that under the terms of the amended franchise the city is entitled to a reduction in fares. The company, however, failed to carry out its agreement and grant the reduction, it is charged by the city.

Reasons given by the company for this action, the petition asserts, were that a citizens' committee sent a petition to the city auditor demanding a referendum election on the ordinance amending the franchise. The petition says the traction company contends that the ordinance is not effective until voted favorably by the people. The city holds, according to the suit, that the ordinance being an amendment to the original franchise is not a legislative act, authorized by the General Assembly of Ohio, and therefore does not have to be submitted to the electors at a referendum election. The referendum petition, according to the city solicitor, is of no value because it seeks a referendum on an amendment to an ordinance passed before the initiative and referendum act was adopted by the Ohio Legislature.

### New Rate in Effect in Knoxville

Six-cent fares are now in effect in Knoxville, Tenn., without a court fight on the part of the Knoxville Railway & Light Company, as was predicted when the Public Utilities Commission granted the increase from 5 cents.

The city had announced its intention of fighting the increase on the grounds that the company is operating a commercial lighting department from which it derives a good return. The city of Knoxville, through its attorneys, now announces, however, that the order increasing the fare will not be appealed to the Supreme Court.

From revenues derived from the increased fare the Traction company is planning some improvements, including extension of its lines, additional service and a faster schedule.

**Ordinance Against One-Man Cars.**—The City Council of Steubenville, Ohio, has passed an ordinance making it a punishable offense for any traction company to operate a one-man car within the corporation limits. The action followed the announcement of the intention of the Wheeling Traction Company to place one-man cars in operation in Steubenville.

### Seven Cents in Nashville

The Nashville Railway & Light Company, Nashville, Tenn., has been allowed to charge a straight fare of 7 cents. This order was issued recently by the Tennessee Public Utilities Commission.

When the company at Nashville was granted an increased fare about two years ago the commission stipulated that the company could sell tickets at the rate of four for 25 cents, or for 6¼ cents each. The company appealed to the commission that it could not get by and sell tickets at that rate. The order was, thereupon, modified and the fare of 7 cents straight was authorized.

### Seven Cents in Toledo

Notices have been posted in the cars operated by the Community Traction Company, Toledo, of a fare increase from 6 to 7 cents with tickets at a rate of eight for 50 cents. The change will become effective on Aug. 1.

## Transportation News Notes

**Agrees to Lower Fares.**—By agreement between the city of Pottsville, Pa., and the Eastern Pennsylvania Railways operating in that city fares will be lowered from 10 cents to 8⅓ cents. Twelve tokens will be sold for $1. This arrangement will be in effect for three months at the end of which time if not satisfactory a valuation of the property will be made.

**Wants Fare Case Reconsidered.**—The Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has filed a petition with the Indiana Public Service Commission asking that its request for a 10-cent fare within the city of Indianapolis be taken up again. The present fare is 5 cents. The case was considered by the commission last December, but no action was taken.

**City to Fight for Five-Cent Fare.**—Mayor Rosson, of Frankfort, Ky., has announced that the city will institute legal steps to have the fare reduced from 6 cents to 5 cents. The 1-cent increase was granted by a city ordinance which provided that the 5-cent fare should be restored when peace had been declared with Germany. This has been done, the Mayor states, but the company is still collecting 6 cents.

**Relieving Congestion in Tampa.**—Safety zones for passengers getting on and off street cars at the corner of Lafayette and Franklin Streets and the corner of Lafayette and Tampa Streets, Tampa, Fla., have been suggested by T. J. Hanlon, Jr., manager of the Tampa Electric Company, as a means for relieving the congestion of traffic at these two busy corners. The zones are to be marked on the pavement.

**Ten-Cent Rate in Effect.**—The North Carolina Public Service Company, Salisbury, N. C., put into effect a 10-cent cash fare in Concord on July 11. No tickets are used. The State Corporation Commission authorized the increase on June 25. This fare supersedes the 8-cent fare which has been in effect since October 1, and which was allowed by the Local Board of Aldermen without the necessity of going before the commission.

**Interurban Rates Advanced.** — The South Carolina State Railroad Commission recently granted permission to the South Carolina Light, Power & Railways Company, Spartanburg, S. C., to increase its railway fares in the interurban territory. The old rate was 7 cents and it is now 10 cents in each of three zones, making an increase from 21 cents to 30 cents for approximately ten miles. The new order became effective July 3.

**Eight-Cent Rate Continued.**—The Indiana Public Service Commission recently approved the petition of the Hammond, Whiting & East Chicago Railway, operating between Hammond and East Chicago, for an extension of its 8-cent fare. When the company appeared before the commission it was brought out that in the first five months of the year 343,843 fewer passengers were carried on the Hammond-East Chicago line than in the corresponding period of 1920.

**Wants to Run Buses.**—C. H. Bosler, president of the Tulsa (Okla.) Street Railway, recently applied for a franchise to establish motor bus lines when a new ordinance was proposed by the city attorney regulating the present jitney lines and permitting jitneys to operate on streets where there are now railway lines. Mr. Bosler added further that his receipts were $200 a month less than they were a few months ago and that a wage cut would have to be put into effect within a short time. The matter was taken under advisement.

**Authorizes Increased Rate.** — The South Carolina Railroad Commission recently granted permission to the Charleston Consolidated Railway & Lighting Company to increase its fare on the interurban line from Charleston to the navy yard. The company petitioned for a 7-cent fare with a ticket rate of four for 25 cents from the incorporated limits to the Navy Yard and from the Navy Yard to North Charleston 5 cents with three tickets for 10 cents. The old fare to the yard was 5 cents.

**Will Punish Violators of Motor Laws.**—Local authorities in Louisville, Ky., have started a strong crusade against violators of the motor laws, and are especially strong in prosecution of motorists who pass standing street cars. There have been so many accidents of late that an effort was made to give motorists jail sentences when fines failed to do much good. One man was given a five-day jail sentence, but brought habeas corpus proceedings and his attorney showed that the present state laws do not contain a jail sentence. The courts retaliated by making the minimum fine $100 for each speeder, and arrest on the spot, instead of notifying them to appear in court.

**Intrastate Rates Equalized on North Shore Road.**—A recent order of the Interstate Commerce Commission fixed the rate of fare for intrastate travel within Illinois, on the Chicago, North Shore & Milwaukee Railroad at 3 cents a mile. Heretofore, while this has been the rate for interstate travel, a rate of 2 cents a mile prevailed for local travel in Illinois, and 2.7 cents a mile for local travel in Wisconsin. An order of the commission on June 14 increased the Wisconsin fare to equal the interstate rate and a subsequent order on July 2 raised the rate in Illinois to the same basis. The cash fare on trains is now 3.6 cents a mile with a minimum of 10 cents. The ticket fare is 3 cents a mile with a 7-cent minimum, and the twenty-five ride ticket is sold at 2.5 cents a mile, except to Chicago.

**Compromise Effected in Springfield.**—Friction between jitney operators and the Springfield Street Railway, Springfield, Mass., culminated recently in a ruling effective on Aug. 1 barring jitneys from Main Street. The transportation committee of the City Council voted to accept the seven new routes submitted by Attorney Cowett, representing the jitneymen's association with the modification that jitneys shall be barred from Main Street between the station arch and State Street. The settlement allowing four jitney operators on the State Street route and three on each of the others amounts to a compromise between the railway management and the jitney men. President Clark, of the Springfield Street Railway, asked that jitneys be taken off all streets on which trolleys operate, as the receipts in Springfield had been greatly decreased in comparison with last year.

**Collection of Ten-Cent Fare Deferred.**—Invoking authority of a 1921 law permitting more than one suspension of a proposed increase in trolley rates, the Board of Public Utility Commissioners on July 12 served notice on the New Jersey & Pennsylvania Traction Company, Trenton, N. J., that the inauguration of a 10-cent fare by the company on its Princeton branch is withheld until Oct. 12. The 10-cent fare was to become effective on April 12 last, but the board suspended the increase until July 12. Unable to determine whether the increase sought is just and reasonable, the board decided to order another three months' suspension. During that time an opinion in the case must be written. The board specified that the second suspension would last until the case was decided. In its petition the company asked permission to charge a fare of 10 cents in each of its four zones between Trenton and Princeton, authority to issue commutation strip tickets containing eleven tickets for $1 and also school children's strips containing forty trips for $2.

# Personal Mention

## W. S. Finlay, Jr., Heads Metropolitan Section of A. S. M. E.

W. S. Finlay, Jr., a vice-president of the American Water Works & Electric Company, New York, has been elected chairman of the Metropolitan Section, the largest of the local sections of the American Society of Mechanical Engineers. This section embraces a membership of more than 3,000 in the metropolitan district. G. I. Rhodes of Ford, Bacon & Davis, secretary, and Robert B. Wolf of R. B. Wolf & Company, treasurer, with A. E. Allen, Westinghouse Electric & Manufacturing Company, constitute the executive committee. The Metropolitan Section, organized in 1910, under which are held public forums on engineering topics, has sub-committees on power engineering, industrial relations, educational, manufacturing, production engineering and legislation.

Mr. Finlay, before his present connection with the American Water Works & Electric Company, was the superintendent of motive power of the Interborough Rapid Transit Company, New York, having been the successor to the late H. G. Stott, who was recognized as the most able power plant designer and operator in this country. Mr. Finlay entered the employ of the Interborough Rapid Transit soon after his graduation from Cornell in 1904. He was born in Hoboken, N. J., in 1882 and received his preliminary training in the public schools of Brooklyn, N. Y.

## Promotions as Well as Reassignments on the Eastern Massachusetts

Among the numerous changes that took place recently on the Eastern Massachusetts Street Railway in the way of reassigning the managers to the various divisions, as was announced in the ELECTRIC RAILWAY JOURNAL for June 25, there were several to whom the changes came as promotions. This was true in the case of Charles E. Whalen, who has been made superintendent of the Lowell district, and Francis J. O'Donoghue, who has assumed the position of manager of the Haverhill district. The appointments became effective on July 6.

Mr. Whalen has been in the employ of the Eastern Massachusetts Company for the past seven years. He was formerly a motorman at Milton and later was brought into the office of the transportation department to assist in the work of equalizing the cars among the different districts. These duties involved the allocating to the carhouses in the various divisions of a sufficient number of cars to furnish the service as determined by their schedules. On a system composed of twelve divisions on which schedule revisions and reroutings are continually being made, proper car distribution forms an important link in efficient operation.

Mr. O'Donoghue, up to the time of his appointment as manager in Haverhill, was superintendent of the Brockton Division. Prior to that he also was employed in the transportation department engaged in the same sort of work. G. F. Chase, formerly local manager in Haverhill, has gone to Lawrence as the superintendent of that division.

## Changes on Tri-City Railways

J. G. Huntoon, who has been vice-president and general manager of the group of properties operated by the Tri-City Railway & Light Company, Davenport, Iowa, has resigned as general manager, but will retain the office of vice-president. T. C. Roderick has been appointed general manager of the Tri-City Railway of Illinois. R. J. Smith has been made general manager of the Tri-City Railway of Iowa. Clark G. Anderson was appointed general manager of the interurban lines of the Clinton, Davenport & Muscatine Railway. E. L. Fischer was appointed general manager of the Muscatine city lines of the Clinton, Davenport & Muscatine Railway.

Mr. Roderick has been assistant general manager of the Tri-City Railway of Illinois and of Iowa and was formerly chief engineer of the Grand Rapids (Mich.) Railway. Mr. Smith has been engineer of way and structures of the United Light & Railways Company and will continue to act in this capacity. Mr. Anderson has been assistant general manager of the Clinton, Davenport & Muscatine Railway and prior to coming with this company in 1914, was Commissioner of Public Works for the city of Moline. E. L. Fischer is also general manager of the Muscatine Lighting Company and under the new arrangement is merely taking over the additional duties of looking after the local street car lines.

## London Transportation Men Visit American Properties

H. E. Blain, C. B. E.; C. S. Louch and J. L. B. Lindsay, of the London Underground Railways and Omnibus Group, who have been in this country for about six weeks, returned to England on July 16. During their stay they visited a number of cities in this country and Canada and extended their trip as far west as Colorado Springs. They found many matters to interest them and expressed themselves before leaving as highly pleased with the results of the trip and appreciative of the courtesies extended to them by the officials of the railway properties in the cities visited. On July 14 they gave a dinner at the Lotos Club to some of the railway men in New York. Among those present were: Frank Hedley, H. H. Vreeland and E. F. J. Gaynor, Interborough Rapid Transit Company; J. A. Ritchie and G. A. Green, Fifth Avenue Coach Company; E. C. Faber, Barron G. Collier Company; J. H. Pardee, J. G. White Company; C. B. Buchanan, Virginia Railway & Power Company; B. A. Hegeman, Jr., H. A. Hegeman, C. C. Castle and H. L. Howell, National Railway Appliance Company.

## A. J. Purinton Succeeds the Late Charles Evans on Atlantic City Road

Election of officers and directors of the three Atlantic City trolley companies took place recently. A. J. Purinton, of the Atlantic City and Shore Railroad Company, was elected a director and vice-president, succeeding the late Charles Evans. Other officers elected were I. H. Silverman, president; A. W. From, treasurer; J. M. Campbell, secretary. The executive committee is made up of H. Silverman, Harry E. Kohn and A. J. Purinton, while the board of directors is composed of I. H. Kohn, Clarence L. Smith, H. R. Coulomb, Penrose Fleisher and Rolia L. Smith.

The officers and directors of the Atlantic and Suburban Railway are L. R. Isenthal, president; Irving B. Woods, vice-president; J. M. Campbell, secretary, and A. W. From, treasurer. The directors are L. R. Isenthal, R. A. Cale, Harry E. Kohn, J. M. Campbell and Irving B. Wood.

The Central Passenger Railway officers are A. J. Purinton, president; J. M. Campbell, secretary, and A. W. From, treasurer. Those appointed to the committee are I. H. Silverman, A. J. Purinton, L. R. Isenthal. Directors, J. M. Campbell, A. W. From and H. R. Coulomb.

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**A. Born** is the successor of E. F. Gould as vice-president of the Western Ohio Railway, Lima, Ohio.

**H. J. Meyer** is no longer in the employ of the Pittsburgh & Beaver Street Railway, Pittsburgh, Pa., as master mechanic.

**D. W. Hanson** is now the auditor of the Northwestern Pennsylvania Railway, Erie, Pa., having succeeded A. Shiel in this capacity.

**J. H. Reed** has been elected vice-president of the Pittsburgh & Beaver Street Railway, Pittsburgh, Pa., to succeed J. D. Callery, Jr.

**R. L. Swittenberg** is the successor of R. T. Long as superintendent of plants and line department of the Southern Public Utilities Company, Anderson, S. C.

**W. M. Krise**, assistant superintendent of the Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa., has severed his connection with the company.

**George E. Carson** has been named engineer of overhead construction on the Ephrata & Lebanon Traction Company, Lebanon, Pa. S. H. Suter had previously held this position.

**D. L. Reisinger**, master mechanic of the Gallipolis & Northern Traction Company, Gallipolis, Ohio, has severed his connection with the company and his place is now filled by Homer Walters.

**Reuel O. Launey**, resigned on July 15 as auditor of the Birmingham Railway, Light & Power Company, Birmingham, Ala. He has gone to Brooklyn, N. Y., where he has assumed duties as auditor of the Brooklyn Edison Company. Entering the service of the Birmingham Railway, Light & Power Company in April, 1904, as earnings clerk in the railway department, he held with credit practically every position in the auditing department and was appointed auditor January 1, 1913. On April 1, 1917, he was appointed auditor of the southern properties of the United Gas & Electric Engineering Corporation in addition to his other duties, which position he held until May 5, 1919, when that corporation withdrew from the control of the southern properties. Since January, 1917, Mr. Launey has been editor of the *Buzzer*, a paper published weekly in the interest of the employees of the company. His ideas are responsible for its reaching and maintaining its high standard and for the place it holds among the employees.

## Obituary

**E. E. Hudson**, president of the Waterbury Battery Company, Waterbury, Conn., died on June 27.

**Edward J. Ronan**, representative of the Gold Car Heating & Lighting Company, Brooklyn, N. Y., died on July 3. Mr. Ronan had been connected with the company for a period of twenty-one years.

**Jacob Scott**, who had served as president of the Susquehanna Traction Company for twenty-five years, died on June 11 in Lock Haven, Pa., where he was the most extensive property owner and president of the Lock Haven Safe and Trust Deposit Company. He was eighty-one years old.

**Frank L. Doolittle**, one of the projectors of Huntington's original traction line, and for many years one of the most prominent figures in the business life of Huntington, died recently at Falls Church, Va. He and others organized the original street car company which secured a franchise for the operation of horse-drawn cars in Huntington. This company was the predecessor of the Consolidated Light & Railway Company, which operated one of the first electric railway systems in this country.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Tubular Steel Pole Prices Are Reduced

### Recent Steel Cut Passed on to Finished Product—Demand Is Light as Buyers Still Hold Off

Prices on tubular steel line poles have been reduced in line with lower costs on steel. The recent general cut of the United States Steel Corporation included a drop of $4 per ton on skelp, from which line poles are made. Therefore prices may be said to have receded in about the same amount on the date this decrease was made, namely, July 7. One of the large pole manufacturers has only recently passed on this price drop, however, as effective the first of this week a reduction of slightly less than 5 per cent has been announced. This is the second decrease that has been made since the first of the year. In the above instance the previous drop, made last February, amounted to $15 per ton.

The general attitude of buyers in this field seems to be to await further price reductions. Demand has consistently remained quiet the greater part of this year and, judging from the inquiries received, it is reported that interest among electric railways is not increasing materially. Producers have only fair stocks on hand as production is down to a minimum. With many tube mills of the steel producers closed down entirely it is sometimes difficult for pole manufacturers to replenish their material and, because of this, shipments occasionally range as long as thirty to sixty days.

## New City Railway in Sydney, Australia

Plans are under way for the construction of a new city railway in Sydney, Australia, partly underground, to cost about £8,000,000. In addition to this the suburban railways will be equipped for electrical operation and extended so that a loop will be formed around the city. From the extension lines will lead to the eastern and western suburbs.

## Price Reduction of 10 per Cent Applied to Motors

A general reduction in prices of motors of 10 per cent was made by manufacturers during the week end of July 9 to 12, and some further changes have just been announced as of July 19. The change affected direct-current motors and polyphase alternating-current motors and motor starting and control apparatus, but did not touch fractional horsepower motors. Single-phase motors of certain manufacturers were also included in the list, but this change was not general. Synchronous motors have been excepted from the cut. This is the second motor price cut this year, the previous one of 10 per cent having taken place early in February.

In addition one prominent manufacturer reports a 10 per cent reduction on transformers of 500-kva. capacity and above. Another prominent manufacturer has taken 10 per cent off all direct-current generators and motor-generators.

## Signaling Apparatus for Australian Railways

Tenders will be received by the Victorian Government Railways Commissioners, Melbourne, Australia, until Aug. 10 for 250 impedance bonds for power signaling (Contract 34,130) and 56 miles of insulated copper wire (Contract 34,131). Tenders will also be received until Aug. 17 for renewals for 3,000 sets of caustic-soda primary cells (Contract 34,145). Specifications may be seen at the Department of Overseas Trade, 35 Old Queen Street, London, S. W. 1, England.

## Two Sizable Girder Rail Orders Placed Recently

Although two sizable orders for girder rails have recently been placed with the leading producing interests, these orders apparently are not indicative of a general improvement in this market, for on the whole conditions are quiet.

The Chicago Surface Lines placed an order a few days ago for 4,000 tons of 129-lb., No. 403, 9-in. girder rail with the Lorain Steel Company. This is the first order for rails placed by the Surface Lines since before the war. Replacement requirements in the meantime have been supplied from a stock of 20,000 tons purchased in 1915, when the price was less than one-half what it is now, although the present level of girder rail prices has receded considerably from its peak. The second recent order is one from the Toronto (Canada) Transportation Commission for 4,000 tons of girder rails and 500 tons of T-rails. It goes to the Bethlehem Steel Company.

## Ten per Cent Reduction on Trolley Poles

Lower prices on trolley poles apparently have had little or no effect in the way of stimulating demand. The second price drop since the first of the year has been made, yet sales are still light. With lower prices on pipe as announced recently, manufacturers of both seamless and lap-welded trolley poles have lowered quotations. The general drop has been about 10 per cent and was made on different dates during the early part of July.

A previous drop of approximately 20 per cent was put into effect on seamless-steel trolley poles during the latter part of last February. A fair number of poles are carried in stock at the present time and on standard poles, style A, virtually stock shipments can be made. Style B poles, which are heavier, require a slightly longer time, and deliveries range up to thirty days on some sizes, especially the long lengths.

## Insulator Prices Decline

### Second Cut This Year Comes at Time When Orders Show Falling Off

Effective July 15 and 18 in different instances several manufacturers of high-tension porcelain insulators have announced lower prices. On suspension types the cut amounts to 5 per cent, while on all others it is 10 per cent. Included in this drop are some of the insulator hardware items. Standard wiring porcelain was also reduced, in a representative instance the discount being increased 8½ points, except on short tubes, where it was 3½ points.

This is the second price decrease to be made on high-tension insulators. The first, amounting to 10 per cent, occurred during the last half of February, but it did not cover single-part pin-type insulators. Demand shows considerable falling off since the first of the year, it is stated. At the present time, though there are a fair number of orders being received from central stations, they are small in size, and both the foreign and domestic markets shape up as quiet. Electric railways up to the present time have taken little or no interest in the market.

## Pole Line Hardware Prices Again Reduced

Prices on pole-line hardware are again down. This time the cut ranges from about 2½ to 7½ per cent in a number of instances, and was made on varying dates from the first to the fifteenth of July. Lower costs on steel are said to be responsible for this latest drop. At least three other general price reductions have been reported in the galvanized line hardware field since the first of the year, and in some instances four decreases. The first cut of 5 to 15 per cent was made in late December and early January, the second of 5 to 7½ per cent occurred on Feb. 15, and the third reduction, amounting to 7½ to 10 per cent, was effective on April 11. Early in June at least one manufacturer and a manufacturer's distributer made a fourth decrease of 5 per cent, so that with this latest drop prices are well down. Demand has just recently started to show a slight improvement, it is reported, though factory stocks are still quite large.

A representative distributer's prices on various items per 100, f.o.b. Chicago, are as follows: carriage bolts, ⅜ in. x 4½ in., $1.93; crossarm braces, 1¼ in. x ¼ in. x 28 in., $13.19; lag screws, ½ in. x 4 in., $3.33, and machine bolts, ⅝ in. x 12 in., $8.95.

## Rolling Stock

**El Paso (Texas) Electric Company,** through Stone & Webster, Inc., has placed an order for ten safety cars with the St. Louis Car Company.

**The Denver (Col.) Tramway** is considering a plan to purchase twenty-seven new Peter-Witt motor cars and to rebuild forty of its present double-truck cars along the lines of the Peter-Witt design.

**Columbus (Ga.) Railroad Company** has ordered four safety cars. These were placed through Stone & Webster, Inc., with the St. Louis Car Company.

**Fonda, Johnstown & Gloversville Railroad Company, Gloversville, N. Y.,** advises that it is changing over its pay-as-you-enter type cars to permit of one-man operation. They will be put into service on August 1.

**Tampa Electric Company, Tampa, Fla.,** which recently ordered twelve Birney safety cars, as noted in last week's issue, placed this order with the St. Louis Car Company.

**The City of New York, N. Y.,** has awarded a contract for eight trackless trollibuses to the Atlas Truck Company York, Pa. The contract went to the latter company, it is stated, because it uses structural steel throughout in the construction of the body frame. The cars are intended for use in connection with the municipal line operated on Staten Island. Since the experimental vehicle was put into operation at Richmond, Va., a number of weeks ago, the Atlas company has received many inquiries.

**Detroit (Mich.) Municipal Railway** was mentioned in the June 18 and July 16 issues as ordering fifty Peter Witt and 100 safety cars. With this latest order the number of cars bought by the city since last fall totals 250, placed as follows: Nov. 16, 1920, twenty-five safety, Osgood-Bradley; April 15, 1921, twenty-five safety, Osgood-Bradley; on May 4, 100 safety, J. G. Brill; July 12, fifty Peter-Witt, Kuhlman; July 12, 100 safety, divided among McGuire-Cummings twenty-five; St. Louis Car Company, fifty, and Osgood-Bradley, twenty-five. Besides these orders the city will probably ask for bids on fifty trackless trolleys, as stated in the July 2nd issue. Specifications on the 100 safety cars will be printed in an early issue.

## Track and Roadway

**Intercity Terminal Railway, Argenta, Ark.,** will provide double tracks on the bridge connecting Little Rock and North Little Rock as soon as the free new bridge is completed. Cars of North Little Rock will then connect with Little Rock cars according to P. C. Warren, of the Intercity Terminal Company.

**Wilmington & Philadelphia Traction Company, Wilmington, Del.,** is doing a great deal of work necessary for the new street paving operations. The company has finished its new track work on East Ninth Street and has finished the Shellpot loop. New tracks have been laid on Lancaster Avenue from Union Street to Woodlawn Avenue and new rails have been installed in Washington Street. On Eighth Street new rails are being installed and these are being laid from Van Buren to Broome Streets. Other work is in prospect.

**Public Service Railway, Camden, N. J.,** has started its reconstruction work on Westfield Avenue between Dudley Tower and Forty-second Street. The tracks will be shifted from the side to the middle of the street. Work will also start shortly on Haddon Avenue, Collingswood.

**Pittsburgh (Pa.) Railways** have been authorized to construct a loop in the East Liberty district. The loop will run from Penn Avenue along Euclid Avenue to Mignonette and St. Clair Streets. The receivers received permission to spend not more than $40,000 in this construction which was necessary in view of the heavy traffic in this district.

**Dallas (Texas) Railway.,** will at once connect its tracks on Masten Street with the tracks on St. Paul, according to Richard Meriwether, vice president and general manager. This connection is made possible by the removal of the tracks of the Texas & Pacific Railway on Pacific Avenue. The traction company several weeks ago completed its Masten Street line to the edge of Pacific Avenue, but work was then stopped until the tracks of the steam railway had been removed. Building of a double track line of St. Paul Street from Elm to Commerce to make possible the desired routing of cross-town lines, is being urged by the Dallas Safety Council. Such a line would greatly relieve the congestion in the business district, it is pointed out.

## Trade Notes

**The Arrow Pump Company,** with general sales offices in the Buhl Building, Detroit, announces that it is now prepared to manufacture centrifugal and other rotating types of pumps in which there will be incorporated a unique design of packing gland with ring oiling principle.

**Tool Steel Gear & Pinion Company, Cincinnati, Ohio,** announces that Richard H. Worcester, 408 Boston Building, Honolulu, T. H., now represents the company there. Two new salesmen have been added to the company's sales force, and the factory space has been enlarged approximately 8,617 sq.ft.

**Automatic Register Company, 4117 Washington Boulevard, St. Louis, Mo.,** manufacturer of automatic fare registers, announces that at its recent annual meeting A. D. Branham was re-elected president, William P. Launtz, vice-president, and George S. Darrow secretary and treasurer. C. H. Wilson was also made vice-president, succeeding M. J. Hopkins.

**Track Specialties Company, 29 Broadway, New York City,** announces that it has recently appointed the following representatives: The Busch Corporation, 1130 Collins Street, St. Louis; P. W. Wood, 811 Canal Bank Building, New Orleans; R. J. Glendinning & Company, 1102 Newhouse Building, Salt Lake City, and C. H. Small, Monadnock Building, San Francisco.

**The M. J. Dougherty Company** has completed and moved into its new quarters which occupy the block from Twenty-fourth to Twenty-fifth Street at Washington Avenue in Philadelphia. These increased facilities for the fabrication of piping of every design, the company says, enable it to offer prices and deliveries which had never before been possible with its smaller factory.

**Union Switch & Signal Company, Swissvale, Pa.,** has received an order from the Boston Elevated Railway for the necessary materials for the installation of an alternating-current electro-pneumatic interlocking at Forest Hills. The principal features of this installation will consist of a model 14 interlocking machine made up of thirteen levers for forty-one signals and sixteen stops, fourteen levers for fourteen single switches and three double slips, and five traffic levers, making a total of thirty-two working levers in a thirty-five-lever frame.

## New Advertising Literature

**Conveyors.** — Conveyors Corporation of America, Chicago, has issued a booklet entitled, "The Proof of the Pudding," which reproduces seventy letters received from users of the company's ash-handling equipment.

**Fuse Cutout.**—Schweitzer & Conrad, Inc., Chicago, have put on the market a new 2,200/6,600-volt primary fuse cutout under the trade name Type E ejector cutout. It is described in their bulletin 103-A.

**Excavator Crane**—Bulletin 6-X describes the Pawling & Harnischfeger Company, Milwaukee, newly developed No. 206 excavator-crane which can be used in coal and ash handling and with a lifting magnet.

**Welding.**—Rail Welding & Bonding Company, Cleveland, Ohio, has just issued its "Welding Instruction Manual," which deals particularly with the Lincoln carbon arc process of welding rail joints. Another portion is devoted to metal electrode welding of especial interest to the engineer in building up car wheels and other shop welding work.

**12/52**

# For Heavier Cars

# PEACOCK

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The man on the job around the shop knows that he needs a practical hand-brake, not a theory. The bigger and heavier the car, the more damage it can do if it "gets away." Shifting disabled cars around the yards, up and down inclines, that's when he wants a good brake.

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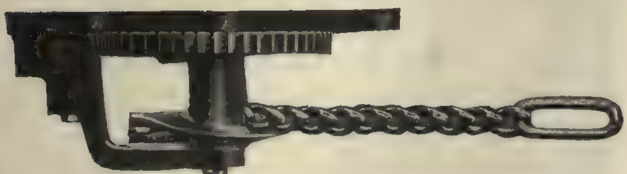
The 12-52 gear ratio Improved Peacock was designed for heavy traction—double-truck cars from 35,000 lbs. up to the largest made. You can see it on the giant subway cars of the New York Municipal Railway. Every detail of those cars was planned for maximum reliability and safety, every possible emergency being considered.



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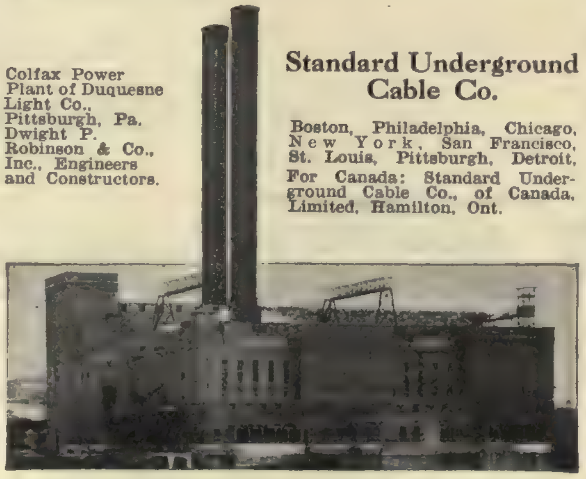
for use in this large power plant. Among engineers it stands for maximum efficiency and dependability, as do STANDARD Products among discriminating buyers.



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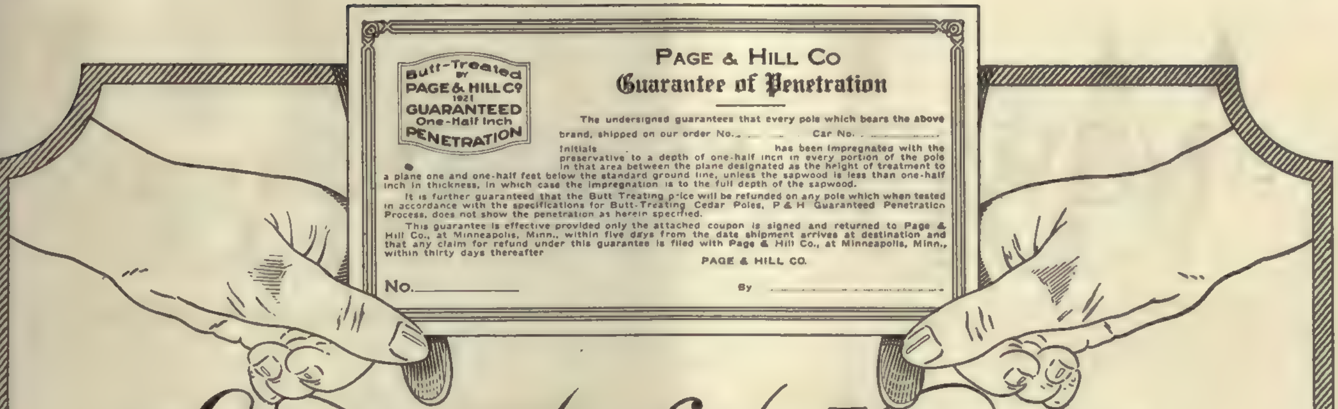

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BY
PAGE & HILL Co
1921
GUARANTEED
One-Half Inch
PENETRATION

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Guarantee of Penetration

The undersigned guarantees that every pole which bears the above brand, shipped on our order No._____ Car No._____ Initials _____ has been impregnated with the preservative to a depth of one-half inch in every portion of the pole in that area between the plane designated as the height of treatment to a plane one and one-half feet below the standard ground line, unless the sapwood is less than one-half inch in thickness, in which case the impregnation is to the full depth of the sapwood.

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*It's the ORIGINAL*

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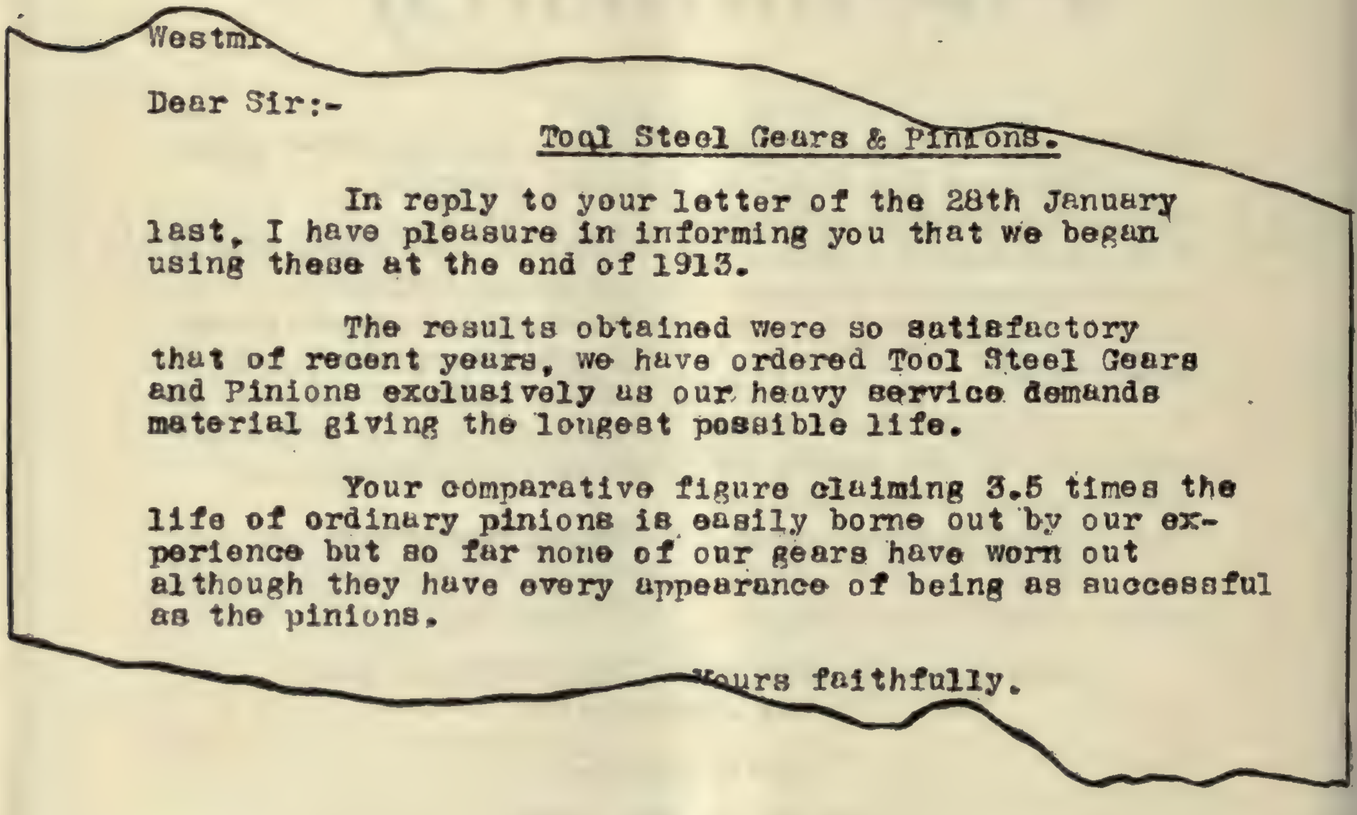
GUARANTEED
One-Half Inch
PENETRATION

*This disc countersunk on the butt-end of every pole Butt-Treated by the P & H Guaranteed Penetration Process is your assurance of one-half inch penetration.*

# NEW ZEALAND *Says:*

T. S. Q. means this

(Copy of letter from the General Manager of the largest Electric Railway line in New Zealand.)



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Dear Sir:-

Tool Steel Gears & Pinions.

In reply to your letter of the 28th January last, I have pleasure in informing you that we began using these at the end of 1913.

The results obtained were so satisfactory that of recent years, we have ordered Tool Steel Gears and Pinions exclusively as our heavy service demands material giving the longest possible life.

Your comparative figure claiming 3.5 times the life of ordinary pinions is easily borne out by our experience but so far none of our gears have worn out although they have every appearance of being as successful as the pinions.

Yours faithfully.

"Tool Steel" Quality T. S. Q. "Tool Steel" Quality

**Tool Steel Gear and Pinion Co.**
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# Carnegie Wrought Steel Wheels

## *for Safety*

IN the manufacture of Carnegie Steel Wheels the steel is first rolled into cylindrical blooms which are cut into short discs and simultaneously rolled and hydraulically forged. The working that the steel receives results in a solid homogeneous structure which insures a wheel free from internal blow-holes and shrinkage cracks so treacherous in cast material.

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The safety of passengers is your responsibility. Carnegie Steel Wheels will help in your endeavor to increase the safety and comfort of travel.

**Carnegie Steel Company has had long experience in the manufacture of rails, cross ties, rail joints, etc. for track maintenance—also in the manufacture of shapes, plates, bars, wheels and axles for rolling stock.**

**For safety, specify Carnegie Steel Wheels.**

## Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

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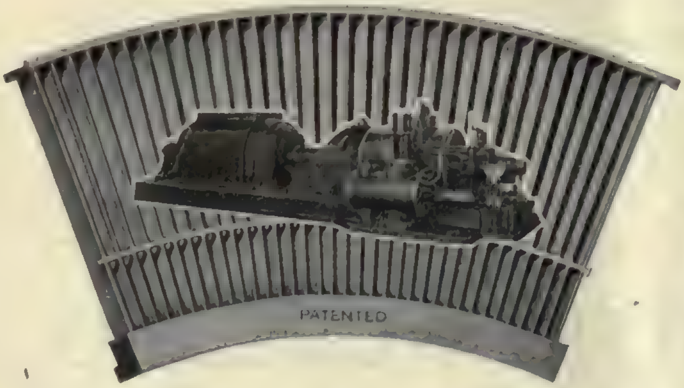
## Have Rugged Blading, True to Design



In the design of Steam Turbines the shape, angle, spacing and fastening of the blades is of first importance in attaining highest efficiency and durability.

The attainment in actual practice of the results contemplated in the design depends upon a blading construction that conforms absolutely to the design in every respect.

Allis-Chalmers Blading is made up in segments of the whole blade ring and the angle and spacing both at the root and at the tip of the blades are fixed by mechanical means with accuracy which cannot be attained by any other method of blade assembling and insures strength and durability.

***Send for Bulletin 1104-F***

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This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units.

The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

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**The use of Bates Permanent Steel Poles with ornamental lights represents maximum economy and the utmost in art.**

**Bates Expanded Steel Truss Co.**

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Go after it—not with old unsightly cars but with new snappy, speedy safeties—Patrons like them—ride in them—swear by *but not at them.*

Safety Car Prices are lower—Schedules can't afford to be slower—Pay out less and save more—with Quality Safeties. We can show you how.

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*"The Birthplace of the Safety Car."*

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**BP-The name of a superior make of gears for electric railway service**

BP gears excel any other make of gears in the following characteristics.

—Hardness to resist wear.
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—Smooth operation because of their accurately cut teeth.
—Long life.

BP gears are the product of the R. D. Nuttall Company and are manufactured in all types and sizes up to nine feet in diameter.

For reliability, long life, and smooth operation, specify Nuttall BP gears.

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Each announcement represents a current Want ot a concern or individual in the industry with some element of profit in each for whoever can fulfill the need. Some have money saving possibilities, others are opportunities for more business; many are employment opportunities while still others offer chances to buy going businesses, plants, property, etc.

"Searchlight" advertisements are constantly changing. New opportunities find their way into this great Want medium each issue. Regular consultation of the "Searchlight" pages should be as important to the careful reader as reading editorial articles of his particular liking. One is news of the industry, the other, the NEWS OF OPPORTUNITIES being offered in the industry. No one can afford to overlook opportunities.

*For Every Business Want*
*"Think* SEARCHLIGHT *First"*

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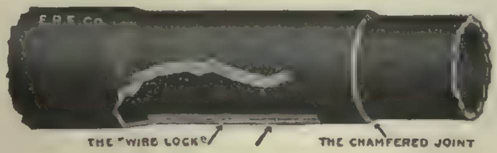
Boston, 176 Federal; Chicago, 112 W. Adams; Cincinnati, Traction Bldg.; New York, 233 B'way; San Francisco, 612 Howard; Seattle, 100 1st Ave. So.

ELRECO TUBULAR POLES



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Third Rail Insulators, Trolley Bases, Harps and Wheels, Bronze and Malleable Iron Frogs, Crossings, Section Insulators, Section Switches.
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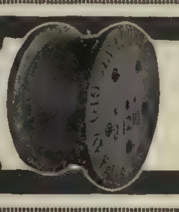

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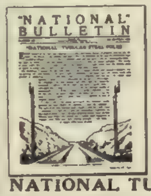

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NATIONAL TUBE COMPANY PITTSBURGH, PA.

BENNETT-FIELD CROSS TIE CO.
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Makes permanent, light, level pavement with a minimum of paving repairs.

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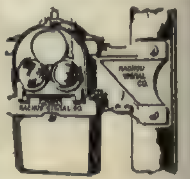
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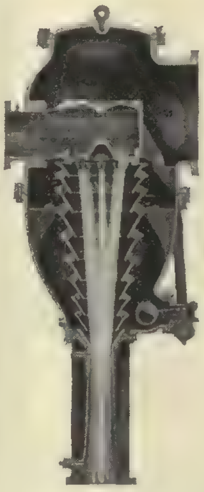

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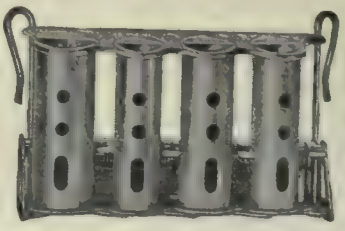

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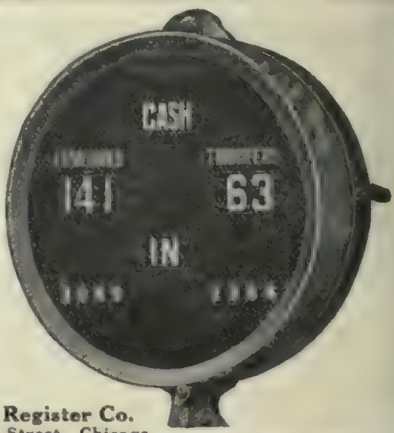

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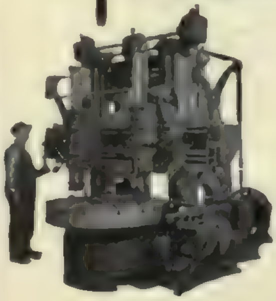

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THE CUTTER ELECTRICAL AND MANUFACTURING CO.
CIRCUIT I-T-E BREAKERS
PHILADELPHIA

## I. T. E.
## Circuit Breakers

for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

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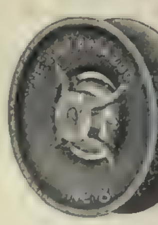
**HACKSAW**
HIGH SPEED
**GLADIUM**
ECONOMY
EFFICIENCY
**BLADES**
GLADIUM CO. Inc 34 Cliff St. New York



**The Kalamazoo Trolley Wheels**

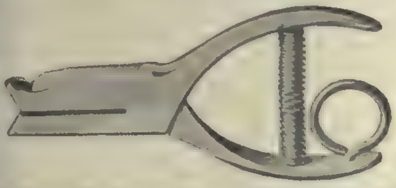
have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

**THE STAR BRASS WORKS**
**KALAMAZOO, MICH., U. S. A.**

Use them in your terminals—
**PEREY TURNSTILES**
**or PASSIMETERS**

*Faster than the ticket seller*

**Perey Manufacturing Co., Inc.**
30 Church Street, New York City



Economical
in the
Long Run

**BONNEY-VEHSLAGE TOOL CO.**
Newark, N. J.

**Heating and Ventilating**

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

**The Cooper Heater Company**
Carlisle, Pa.

**ELECTRIC HEATER EQUIPMENTS**

**THERMOSTAT CONTROL EQUIPMENTS**

Address All Communications to
**BUSH TERMINAL**
**(220 36th St.)**
**Brooklyn, N. Y.**

*Literature on Request*

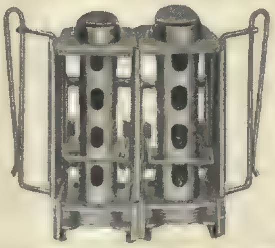
**HORNE MANUFACTURING CO.**
**Mercer and Colgate Streets, Jersey City, N. J.**

Hand Brakes—Air Purifiers for Compressors—Lighting Fixtures—Electric Vibrating Bells—Thermostats—Switches, Receptacles and Plugs—Junction Boxes, Portables and Reflectors.

**Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.**

**CONSOLIDATED CAR HEATING CO.**
**ALBANY, NEW YORK, CHICAGO**

**JOHNSON Universal Changer**



**Adjustable**

The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

**Flexible**

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

**JOHNSON FARE BOX COMPANY**
**Ravenswood, Chicago, Ill.**

B. A. Hegeman, Jr., President
Charles C. Castle, First Vice President W. C. Lincoln, Mgr. Sales & Engineering
Harold A. Hegeman, Vice Pres. and Treas. Fred C. J. Dell, Secretary

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**50 East 42nd St., New York City**

Hegeman-Castle Corporation
343 So. Dearborn St., Chicago, Ill.

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Munsey Bldg., Washington, D. C.

National Railway Appliance Co.
Little Bldg., Boston, Mass.

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Tool Steel Gears and Pinions
Anderson Slack Adjusters
Genesco Paint Oils
Dunham Hopper Door Device
Feasible Drop Brake Staffs
Flaxlinum Insulation
Anglo-American Varnishes, Paints, Enamels, Surfacers, Shop Cleaner
Johnson Fare Boxes
Drew Line Material and Railway Specialties
Perry Side Bearings
Hartman Centering Center Plates
Economy Power Saving Meter
H & W Electric Heaters
Garland Ventilators
Pitt Sanders
National Safety Car Equipment Co's One-Man Safety Cars

PS
HEATERS

**Car Heating and Ventilation**

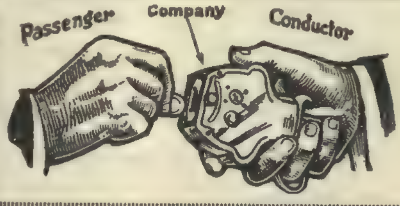
is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

**The Peter Smith Heater Company**
**1725 Mt. Elliott Ave., Detroit, Mich.**

**Car Seating, Broom and Snow Sweeper**
**Rattan, Mouldings, etc.**

**AMERICAN RATTAN & REED MFG. CO.**
Brooklyn, N. Y.

**AMERICAN MEANS QUALITY**
**RATTAN SUPPLIES OF EVERY DESCRIPTION**



**Direct Automatic Registration**
By the
**Passengers**

**Rooke Automatic Register Co.**
**Providence, R. I.**

Over twenty lines having from two to eight zones collect fares with the aid of

**CLEVELAND FARE BOXES**

**The Cleveland Fare Box Company**
**CLEVELAND, OHIO**
Canadian Cleveland Fare Box Co., Ltd., Preston, Ontario

ELECTRIC RAILWAY JOURNAL

# Think "SEARCHLIGHT" First

## ADVERTISING RATES

**POSITIONS VACANT**—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

**POSITIONS WANTED**—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

**ADD 5 WORDS** for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

**DISCOUNT OF 10%** if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

**ADS IN DISPLAY TYPE**—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

**RATE PER INCH** for ads in display space:

1 to 3 in., $4.50 an in.
4 to 7 in., $4.30 an in.
8 to 14 in., $4.10 an in.
15 to 29 in., $3.90 an in.
30 to 49 in., $3.80 an in.
50 to 99 in., $3.70 an in.

# POSITIONS VACANT EMPLOYMENT POSITIONS WANTED

## POSITIONS WANTED

CAPABLE master mechanic of proven executive ability, now employed, seeks opportunity to make change, where initiative and dependability are required; 20 years' experience in electric railway field, thoroughly competent in the construction, rebuilding, maintenance and operation of city and interurban cars. PW-918, Elec. Ry. Journal, Old Colony Bldg., Chicago.

MAN, age 45, seven years' experience handling material accounts, stores records, shop payrolls, distribution sheets, wishes a position; would leave New York. PW-920, Elec. Ry. Journal.

POSITION wanted in any one or a combination of the following allied power or railway activities: Purchasing agent, electrical superintendent, superintendent of construction, superintendent of distribution and operation, superintendent of rolling stock, superintendent of equipment, district superintendent. Technical graduate, eleven years' experience. Now enjoy excellent relations on engineering staff of large railway equipment manufacturer. Personal reasons for leaving. Available upon customary notice. PW-924, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

SUPERINTENDENT of transportation desires a change. Nearly 18 years' experience on large city and interurban properties with a proven record as a competent transportation official; successful in dealing with public and labor. Personal reasons for desiring a change and relations with present employers are pleasant and agreeable. Fully competent to take over any property and operate same in an economical and efficient manner. Best of references as to character and ability. PW-922, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

TRACK superintendent requires position with electric railroad in any part of the world. Young, energetic, ambitious; progressive. Had experience in tropics. Can speak Hindustandi. PW-921, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

TRAFFIC manager or assistant superintendent by young man with 11 years' experience as trainman, inspector, schedule and chief clerk; successful in dealing with employees. PW-908, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

VALUATION engineer, experienced in valuation of electric railways, electric light and power properties. Also experienced in management, construction and maintenance of electric railway properties. PW-896, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

## SALESMAN AVAILABLE

SALES manager or assistant, university education, fifteen years' experience selling to railroads and public service corporations, seeks new position in similar line with a representative company. Fully qualified for any executive or sales position. Highest references. AS-923, Elec. Ry. Journal.

## BUSINESS OPPORTUNITY

PARTNER wanted in hydro-electric enterprise now lighting two towns. In order to extend service owner will accept partner. Ten thousand dollars for half interest. For particulars address, Glen Gardner, Route 7, Ionia, Michigan.

FOR SALE

**Interurban Car**
**Substation Equipment**

**BEECH GROVE TRACTION CO**
755 Century Building, Indianapolis, Ind.

**For 20 Years**
we have been
Buying and Selling

**Second-Hand Cars**
Trucks and Motors

At Your Service

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa

FOR SALE

1—22x42 480 H.P. Bates Corliss Engine direct connected to 325 K.W., 550 Volt D.C., 100 R.P.M. Westinghouse Generator with Switchboard panel.

***Location Mattoon, Ill.***

**CENTRAL ILLINOIS PUBLIC SERVICE COMPANY**
***D. R. Truax Purchasing & Stores Agent***
Springfield, Illinois.

**You can get**

**A Production Checker**
**at little cost**

Here is an opportunity to get a *Productograph* to keep count and make curve chart record on one to twenty producing machines. From these records you know exactly the production you are actually getting from your machines. No guessing. It is in first class condition and various spare parts are included.

**Bargain price for quick sale.**

W. A. Hefner, care of McGraw-Hill Co., 10th Ave. at 36th St., New York City

**WANTED**

One or two new or second-hand double truck air operated nose type

**SNOW PLOWS**

Advise price, general condition and complete specifications.

**Eastern Pennsylvania Railways Company**
Pottsville, Pa.

***The Searchlight Section of this paper—***

is devoted exclusively to the advertising of idle used and surplus new equipment, and all other business "Opportunities" identified with the field covered by this paper.

***Buyers and others consult "Searchlight" ads for what they want.***

You can reach them quickly and at small cost through an advertisement in the Searchlight Section.

0310

20% *NEW* 20%

# REPAIR PARTS

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G-E—67—58—57—52—1000

## 20% Off Current Prices

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G-E 1200-800, W-12A

## 20% Over Junk Value

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Rebuilt G-E 67 Motors

Rewound Armatures and Fields for Above Motors

Malleable—Gear Cases—Sheet Steel

K, K-2, K-10, K-11, K-12, K-14, K-6, Controllers and Repair Parts

AA-1 Air Compressors and Repair Parts

Various Truck Repair Parts

*Send Us Your Inquiries*

*GOING FAST*

ARE YOU GETTING YOURS?

RECLAMATION DEPARTMENT

20% **EASTERN MASS. ST. RY. CO.** 20%

1 Beacon Street, Boston, Mass.

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"Searchlight"
is
Quick Action
Advertising

0233

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OFFER FOR IMMEDIATE SHIPMENT

## 500-KW. MOTOR GENERATOR SET

1—500 kw. Westinghouse 550 volt, 833 amp., 514 r.p.m. compound wound dynamo direct connected to—

1—720 hp. Westinghouse 3 phase, 60 cycle, 2300 volt, synchronous motor. Outfit self contained, and complete with starting equipment for A.C. and D.C. ends.

**ARCHER & BALDWIN, INC.**

Tel. 4337-8 Rector 114-118 Liberty St.

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## "Opportunity" Advertising:

Think "*SEARCHLIGHT*" First!

0098

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Circuit Breakers**
Condit Electrical Mfg. Co.

**Anchors, Guy**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Automobiles and Buses**
Brill Co., The J. G.

**Axles**
Bemis Car Truck Co.
St. Louis Car Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Babbitt Metal**
Ajax Metal Co.
More-Jones Brass & Metal Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Bearings and Bearing Metals**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bearings, Oilless, Graphite, Bronze and Wood**
Bound Brook Oil-less Bearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.
Rail Welding & Bonding C.o

**Bonding Apparatus**
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

**Bonds, Rail**
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

**Bridges and Buildings**
American Bridge Co.

**Brooms, Track, Steel or Rattan**
American Rattan & Reed Mfg. Co.
Zelnicker, W. A., Supply Co., Inc.

**Brushes, Carbon**
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

**Bunkers, Coal**
American Bridge Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.

**Bushings, Graphite and Wooden**
Bound Brook Oil-less Bearing Co.

**Cables (See Wires and Cables)**

**Carbon Brushes (See Brushes, Carbon)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
Differential Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
General Electric Co.

**Castings, Brass, Composition or Copper**
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Ceiling, Car**
Pantasote Co.

**Change Carriers**
Galef, J. L.

**Circuit Breakers**
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coin-Counting Machines**
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Traction Brake Co.

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

**Conduit Fittings**
Chicago Fuse Mfg. Co.

**Connectors, Solderless**
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**
Russell Mfg. Co.

**Controllers or Parts**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Electric Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Allison & Co., J. E.

**Conveying and Hoisting Machinery**
American Bridge Co.
Columbia M. W. & M. I. Co.

**Copper Wire**
Anaconda Copper Mining Co.
Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Traction Brake Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Cresote**
Barrett Co.

**Cresoting**
Barrett Co.

**Cross Arms (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals (See Signals, Crossing)**

**Crossings, Frog and Switch**
Wharton, Jr., & Co., Wm.

**Crossings, Track (See Track, Special Work)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
Pantasote Co.
St. Louis Car Co.

**Cutouts**
Chicago Fuse Mfg. Co.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Works
Electric Equipment Co.
Foster Co., H. M.
Hyman Michaels Co.
Karasik, Friedman & Co., Inc.
Reading Engineering Co.
Transit Equipt. Co.

**Derailing Devices (See also Track Work)**
Wharton Jr., & Co., Wm.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

**Electrically Operated Switches (Air or Oil)**
Condit Electrical Mfg. Co.

**Electrical Wires and Cables**
American Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Horton, Barker & Wheeler
Jackson, Walter
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J. G.

**Engines, Gas, Oil or Steam**
Allis Chalmers Mfg. Co
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**
Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
National Railway Appliance Co.

**Feed Water Heating**
Schutte & Koerting Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.

**Fibre and Fibre Tubing**
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

# In Sunny Spain

## as well as all over the rest of the world

## Twelve New American-Built Cars

like these, have been delivered to the
Cataluna Tramways in Barcelona, Spain.

*For Your Own Cars—Specify*

# AGASOTE

(TRADE-MARK)

for roofs, headlining and wainscoting

# PANTASOTE

(TRADE-MARK)

for car curtains and upholstery

**THE PANTASOTE COMPANY, 11 Broadway, New York**

**People's Gas Building, Chicago, Ill.** **751 Monadnock Bldg., San Francisco, Cal.**

## WHAT AND WHERE TO BUY

**Field Coils (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.

**Floor Plates**
American Abrasive Metals Co.

**Forgings**
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track (See Track Work)**

**Funnel Castings**
Wharton, Jr., & Co., Wm.

**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

**Fuses, Refillable**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

**Gages, Oil and Water**
Ohio Brass Co.

**Gaskets**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas-Electric Cars**
General Electric Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Carnegie Steel Co
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Bemis Car Truck Co
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**General Printing**
Shanklin Equipment Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Gongs (See Bells and Gongs)**

**Grates, Chain**
Green Eng. Co.

**Greases (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Guards, Cattle**
American Bridge Co.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Hacksaws**
Gladium Co., Inc.

**Harps, Trolley**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp. Co.
Electric Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Headlining**
Haskelite Mfg. Co.
**Pantasote Co.**

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.

**Hose, Bridges**
Ohio Brass Co.

**Hydraulic Machinery**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Hydrogrounds**
Horne Mfg. Co.

**Injectors**
Schutte & Koerting Co.

**Inspection**
Electrical Testing Lab's

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Johns-Manville, Inc.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

**Insulation (See also Paints)**
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Insulators (See also Line Material)**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Flood City Mfg. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
Electric Service Supplies Co.
Hubbard & Co.

**Jacks (See also Cranes, Hoists and Lifts)**
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.

**Joints, Rail**
Carnegie Steel Co.
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., The J. G.

**Junction Boxes**
Standard Underground Cable Co.

**Lamp Guards and Fixtures**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent (See also Headlights)**
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
Nichols-Lintern Co.
Ohio Brass Co.

**Lanterns, Classification**
Nichols-Lintern Co.

**Lathe Attachments**
Williams & Co., J. H.

**Lathes, Car Wheel**
Niles-Bement-Pond Co.

**Lightning Protection**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Line Material (See also Brackets, Insulators, Wires, etc.)**
Anderson Mfg. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Loaders, Wagon, Truck or Car**
Portable Machinery Co.

**Locking Spring Boxes**
Wharton, Jr., & Co., Wm.

**Locomotives, Electric**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.

**Lubricants, Oil and Grease**
Galena-Signal Oil Co.

**Machine Tools**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work**
Columbia M. W. & M. I. Co.

**Manganese Steel Castings**
Wharton, Jr. & Co., Wm.

**Manganese Steel Special Track Work**
Wharton, Jr., & Co., Wm.

**Meters, Car, Watt-Hour**
Economy Electric Devices Co.

**Meters (See Instruments)**
Electric Service Suplies Co.

**Money Changers**
Galef, J. L.

**Motormen's Seats**
Brill Co., J. G., The
Electric Service Supplies Co.
Wood Co., Chas. N.

**Motors, Electric**
Allis Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Motors and Generators, Sets**
General Electric Co.

**Nuts and Bolts**
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

**Oil Burning Equipment**
Schutte & Koerting Co.

**Oil Circuit Breakers**
Condit Electrical Mfg. Co.

**Oils (See Lubricants)**

**Oil Switches**
Condit Electrical Mfg. Co.

**Omnibuses**
Trackless Transportation Co.

**Packing**
Westinghouse Elec. & Mfg. Co.

**Paints and Varnishes for Woodwork**
National Ry. Appliance Co.

**Paving Bricks, Filler & Stretcher**
Nelsonville Brick Co.

**Paving Material**
American Brake Shoe & Fdry. Co.
Barrett Co.
Nelsonville Brick Co.

**Paving Pitch**
Barrett Co.

**Pickups, Trolley Wire**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions (See Gears)**

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Pipe**
National Tube Co.

**Pipe Fittings**
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

**Planers (See Machine Tools)**

**Pliers, Insulated**
Electric Service Supplies Co.

**Pole Reinforcing**
Hubbard & Co.

**Poles, Metal Street**
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

**Poles, Ties, Post, Piling and Lumber**
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Page & Hill Co.

**Poles, Top Switches**
Condit Electrical Mfg. Co.

**Poles, Trolley**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Suplies Co.
National Tube Co.
Nuttall Co., R. D.

**Poles, Tubular Steel**
Electric Railway Equipment Co
National Tube Co.

**Poles and Ties Treated**
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Page & Hill Co.

**Power Saving Devices**
Economy Electric Devices Co.
National Ry. Appliance Co.

**Preservatives**
Barrett Co.

**Pressure Regulators**
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Pumps**
Allis-Chalmers Mfg. Co.
Schutte & Koerting Co.

**Punches, Ticket**
Bonney-Vehslage Tool Co.
International Register Co., The
Wood Co., Chas. N.

**Purifiers, Feed Water**
Scaife & Sons Co., Wm. B.

**Rails**
Carnegie Steel Co.
Foster Co., L. B.

**Rail Grinders (See Grinders)**

**Rails, Relaying**
Foster Co., L. B.
Zelnicker, Walter A., Supply Co. Inc.

**Railway Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Rail Welding**
Rail Welding & Bonding Co.

**Rattan**
American Rattan & Reed Mfg. Co
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

**Registers and Fittings**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Rooke Automatic Register Co.

**Reinforcement, Concrete**
American Steel & Wire Co.
Carnegie Steel Co.

**Relays**
Condit Electrical Mfg. Co.

**Remote Control Switches**
Condit Electrical Mfg. Co.

**Repair Shop Appliances (See also Coil Banding and Winding Machines)**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Repair Work (See also Coils)**
Cleveland Armature Works
Columbia M. W. & M. L. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Replacers, Car**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Resistance, Grid**
Columbia M. W. & M. I. Co.

**Resistance, Wire and Tube**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Retrievers, Trolley (See Catchers and Retrievers, Trolley)**

**Rheostats**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Roof Building**
Barrett Co.

**Roofing, Car**
Pantasote Co.

**Roofs**
Haskelite Mfg. Co.

**Sand Boxes**
Horne Mfg. Co.

**Sanders, Track**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

**Sash Fixtures, Car**
Brill Co., The J. G.

**Scrapers, Track (See Cleaners and Scrapers, Track)**

**Seating Materials**
Brill Co., The J. G.
**Pantasote Co.**

# VAN DORN
## Automatic Pin-and-Link Couplers

No. 21 Pin-and-Link Coupler

No. 200 Swivel
Spring Draft Gear

Van Dorn Pin-and-Link Couplers are the lightest and most effective means for ordinary coupling.

An important feature of all Van Dorn Couplers is that only one man is needed to switch cars. After the trainman has unlocked Couplers by pulling one pin, it is not necessary for him to be near them, thus enabling him to operate cars when uncoupling and eliminate possibility of accidents.

The double spring draft gear of the No. 21 Coupler absorbs all shocks direct in every position of 120 degree radial movement and makes train move as smoothly as one car. This swivel draft gear saves a large amount of weight, as it takes the place of the usual heavy draft housing and anchor casting.

Van Dorn No. 21 Pin-and-Link Coupler pictured above is especially adapted to interurban service.

**Van Dorn Coupler Company**
**2325 So. Paulina St., Chicago, Ill.**

## They are uniform in quality

*They talk for themselves*

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**Pittsburgh Office:**
**636 Wabash Building**

**Canadian Distributors:**
**Lyman Tube & Supply Co., Ltd.**
**Montreal and Toronto**

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***wears longer—runs cooler—costs less***

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Case Hardened Bushings
Case Hardened Nuts and Bolts
Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

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**THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.**

***All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.***

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**Bound Brook, New Jersey** ***Detroit Office: 1723 Ford Bldg.***

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# A. E. R. A. Standards

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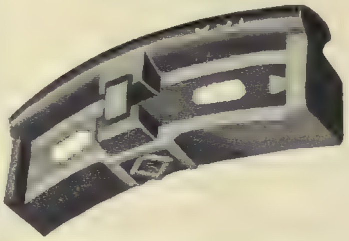

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D-87 for Wide Treads

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**30 Church Street, New York**
**332 So. Michigan Ave., Chicago** **Chattanooga, Tenn.**

# WHAT AND WHERE TO BUY

**Seats, Car (See also Rattan)**
American Rattan & Reed Mfg. Co.
Brill Co., The J. G.
St. Louis Car Co.

**Second-Hand Equipment**
Archer & Baldwin
Cleveland Armature Works
Electric Equipment Co.
Foster Co., H. M.
Hyman Michaels Co.
Karasik, Friedman & Co., Inc.
Reading Eng. Co.
Transit Equipt. Co.
Zelnicker, Walter A., Supply Co., Inc.

**Shades, Vestibule**
Brill Co., The J. G.

**Shovels**
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
Hubbard & Co.

**Signals, Car Starting**
Consolidated Car Heating Co.
Electric Service Suplies Co.
National Pneumatic Co., Inc.

**Signals, Indicating**
Nichols-Lintern Co.

**Signal Systems, Block**
Electric Service Supplies Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

**Slack Adjusters (See Brake Adjusters)**

**Slag**
Carnegie Steel Co.

**Sleet Wheels and Cutters**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

**Smokestacks, Car**
Nichols-Lintern Co.

**Snow-Plows, Sweepers and Brooms**
American Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.

**Solderless Connectors**
Frankel Connector Co.

**Spikes**
American Steel & Wire Co.

**Splicing Compounds**
Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves (See Clamps and Connectors)**

**Spray Nozzles**
Schutte & Koerting Co.

**Springs, Car and Truck**
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
Standard Steel Works Co.

**Sprinklers, Track and Road**
Brill Co., The J. G.
St. Louis Car Co.

**Steel Castings**
Wharton, Jr., & Co., Wm.

**Steps, Car**
American Abrasive Metals Co.
American Mason Safety Tread Co.

**Strand**
Copper Clad Steel Co.
Roebling's Sons Co., J. A.

**Street Railway Transfer Printing**
Shanklin Equipment Co.

**Stokers, Mechanical**
Babcock & Wilcox Co.
Westinghouse Elec. & Mfg. Co.

**Storage Batteries (See Batteries, Storage)**

**Subway Switches**
Condit Electrical Mfg. Co.

**Superheaters**
Babcock & Wilcox Co.
Power Specialty Co.

**Sweepers, Snow (See Snow Plows, Sweepers and Brooms)**

**Switch Stands**
Ramapo Iron Works

**Switches, Selector**
Nichols-Lintern Co.

**Switches, Track (See Track Special Work)**

**Switchboxes**
Chicago Fuse Mfg. Co.

**Switches and Switchboards**
Allis-Chalmers Mfg. Co.
Anderson Mfg. Co., A. & J. M.
Condit Electrical Mfg. Co.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Tapes and Cloths (See Insulating Cloth, Paper and Tape)**

**Telephones and Parts**
Electric Service Supplies Co.

**Terminals, Cable**
Standard Underground Cable Co.

**Testing, Commercial and Electrical**
Elec'l Testing Laboratories

**Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats**
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

**Ticket Choppers and Destroyers**
Electric Service Supplies Co.

**Ticket Issuing Machine**
Shanklin Equipment Co.

**Ties, Mechanical**
Dayton Mechanical Tie Co.

**Ties and Tie Rods, Steel**
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood Cross (See Poles, Ties, Poles, etc.)**

**Tongue Switches**
Wharton, Jr., & Co., Wm.

**Tool Holders**
Williams & Co., J. H.

**Tool Steel**
Carnegie Steel Co.

**Tools, Thread Cutting**
Williams & Co., J. H.

**Tools, Track and Miscellaneous**
American Steel & Wire Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

**Towers and Transmission Structures**
American Bridge Co.
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse Elec. & Mfg. Co.

**Track Expansion Joints**
Wharton, Jr., & Co., Wm.

**Track, Special Work**
Barbour-Stockwell Co.
Cheatham Electric Switching Device Co.
Columbia M. W. & M. I. Co.
Engell & Hevenor
New York Switch & Crossing Co.
Ramapo Iron Works
St. Louis Frog & Switch Co.
Wharton, Jr., & Co., Inc., Wm.

**Transfer Issuing Machines**
Shanklin Equipment Co.

**Transfer Tables**
American Bridge Co.
Archbold-Brady Co.

**Transfer Issuing Machines**
Shanklin Equipment Co.

**Transformers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Treads, Safety, Stair, Car Step**
American Abrasive Metals Co.
American Mason Safety Tread Co.

**Tripping Transfers**
Condit Electrical Mfg. Co.

**Trolley Bases**
Anderson Mfg. Co., A. & J. M.
Electric Service Suplies Co.
General Electric Co.
Horne Mfg. Co.
Nuttall Co., R. D.
Ohio Brass Co.

**Trolley Bases, Retrieving**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Nuttal Co., R. D.
Ohio Brass Co.

**Trolley Materials, Overhead**
Flood City Mfg. Co.
Ohio Brass Co.

**Trolleys and Trolley Systems**
Ford Chain Block Co.

**Trolley Wheels (See Wheels, Trol-**

**Trolley Wheel Bushings**
Flood City Mfg. Co.

**Trolley Wheels and Harps**
Flood City Mfg. Co.

**Trolley Wire**
American Electrical Work
American Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Clad Steel Co.
Roebling's Sons Co., John A.

**Trucks, Car**
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

**Tubing, Steel**
National Tube Co.

**Turbines, Steam**
Allis-Chalmers Mfg. Co.
General Electric Co.
Terry Steam Turbine Co.
Westinghouse Elec. & Mfg. Co.

**Turbine, Water**
Allis-Chalmers Mfg. Co.

**Turnstiles**
Perey Mfg. Co., Inc.
Ohio Brass Co.
Schutte & Koerting Co.

**Upholstery Material**
American Rattan & Reed Mfg. Co.

**Valves**
Westinghouse Traction Brake Co.

**Vacuum Impregnation**
Allis-Chalmers Mfg. Co.

**Ventilators, Car**
Brill Co., The J. G.
National Railway Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

**Vises, Pipe**
Williams & Co., J. H.

**Washers**
Bound Brook Oil-less Bearing Co.

**Water Softening & Purifying Systems**
Scaife & Sons Co., Wm. B.

**Welders, Portable Electric**
Electric Ry. Improvement Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

**Welding Processes and Apparatus**
Electric Ry. Improvement Co.
General Electric Co.
Metal & Thermit Corp.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

**Welders, Rail Joint**
Ohio Brass Co.
Rail Welding & Bonding Co.

**Wheel Guards (See Fenders and Wheel Guards)**

**Wheel Presses (See Machine Tools)**

**Wheels, Car, Cast Iron**
Bemis Car Truck Co.

**Wheels, Car, Steel and Steel Tired**
American Steel Foundries
Carnegie Steel Co.
Bemis Car Truck Co.
Standard Steel Works Co.

**Wheels, Trolley**
Anderson Mfg. Co., A. & J. M.
Bound Brook Oil-less Bearing Co.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

**Whistles, Air**
General Electric Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Wire Rope**
American Steel & Wire Co.
Copper Clad Steel Co.
Roebling's Sons Co., John A.

**Wires and Cables**
American Elec'l Works
American Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Clad Steel Co.
General Electric Co.
Roebling's Sons Co., John A.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

**Wood Preservatives**
Barrett Co.

**Woodworking Machines**
Allis-Chalmers Mfg. Co.

**Wrenches**
Williams & Co., J. H.

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*Sole Manufacturers*
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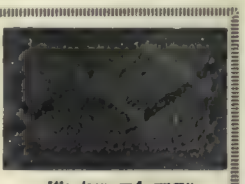

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PITTSBURGH, PA.
manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
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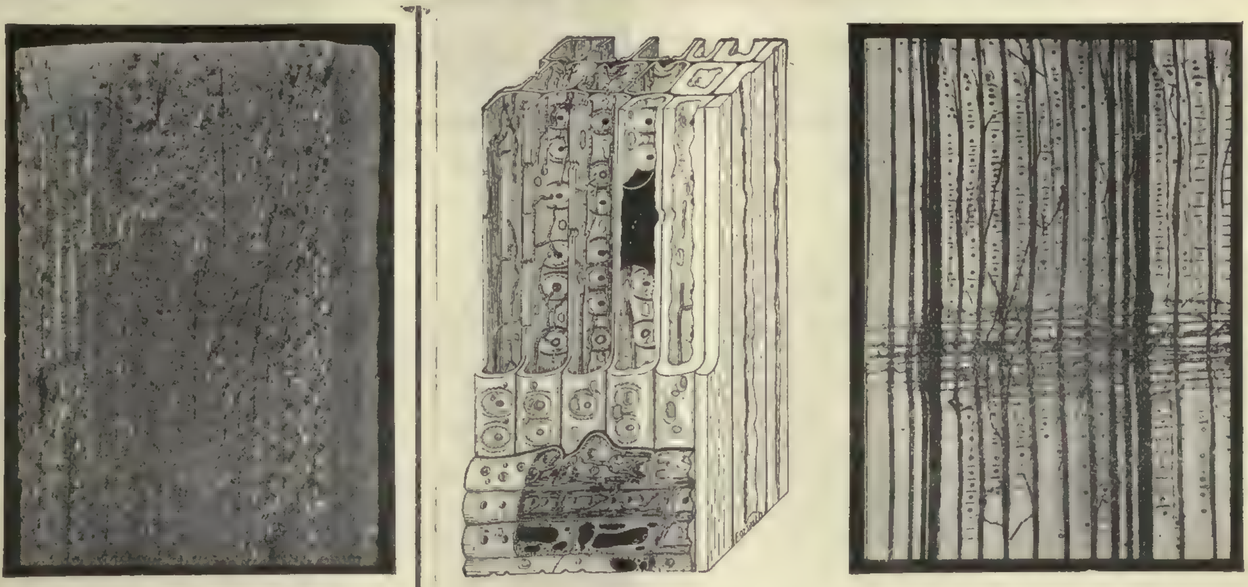


"Decay illustrated: At left an ordinary block of wood honeycombed by wood destroying fungus as seen by the eye; at right, a magnified photograph of fungal threads penetrating the wood cells. In centre, a drawing of a block of wood, greatly magnified, illustrating the progress of decay. First only small holes appear in the cell walls, due to the penetration of the threads (hyphae) of the fungus. Then as the dissolving action proceeds further, the cell walls are gradually "broken down" until destruction is completed. (Photographs and drawing supplied by the Dept. of Wood Technology, N. Y. State College of Forestry.)"

## *"Why Lumber Rots"*

"Shorn of technical phraseology, wood decay is simply the destruction of the wood by plant organisms or fungi. These grow from microscopic spores—similar to seeds—whose roots permeate the wood structure, penetrating and "breaking down" the cell walls.

"In their fruiting stage, these fungi take the form of moulds, masses of fine cotton-like threads, or mushroom growths varying in shape and color. A single one may throw off billions of spores which lodge on new timber. If conditions are favorable, these spores germinate and thus continue indefinitely the cycle of decay.

"While wood decay is prevalent practically everywhere, the rapidity with which it develops varies with the climate and the species of wood attacked. Its progress also depends upon air, moisture and warmth. Whenever wood comes in contact with the ground, masonry, concrete, or other wood, decay quickly develops and the timber at these points of contact usually has to be replaced long before the rest of the structure has been materially affected." *(From Carbosota full-page advertisement in The Saturday Evening Post of June 18th.)*

# *Specify Carbosota for Preservative Treatment*

Lumber for sub-flooring or roof-decks of buildings; timber for underground or surface construction at mines; poles and crossarms for electric transmission lines—to all these, and to many other forms of structural wood, preservative treatment with Carbosota gives definite protection against premature decay.

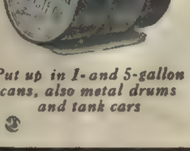
Why, then, discard wood? Why add to the cost and increase the difficulty of construction by employing substitutes for wood, when the trouble and expense incident to rot can so easily be overcome?

Lumber has many natural advantages, and when made decay-resistant by treatment with Carbosota there is added a degree of permanency that makes it unequalled for general building purposes.

But, to be effective, Carbosota must be used properly. Not only every step in the preservative treatment of the timber, but the species, grade and condition of the timber itself, should be fully covered by definite specifications.

Such specifications, specially adapted to meet any given condition, together with suggestions for equipment and methods of procedure, may be obtained without cost by addressing our nearest office.

*(Green wood cannot be effectively creosoted by non-pressure processes. It should be seasoned. All framing, drilling of bolt holes, etc., should be done before treatment. If this is impossible, two brush coats of Carbosota should be applied to all untreated surfaces exposed by subsequent cutting or drilling.)*



*Put up in 1-and 5-gallon cans, also metal drums and tank cars*

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The ideal wood preservative for non-pressure treatments, i.e., Surface treatments (brushing, spraying and dipping) and the Open Tank process (hot and cold, or hot and cooling treatment).

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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Ajax Metal Co. 39
Allis-Chalmers Mfg. Co. 26
Allison & Co., J. E. 21
American Abrasive Metals Co. 40
Amer. Brake Shoe & Fdry. Co. 39
American Bridge Co. 21
American Car Co. 45
American Electrical Works 29
American Mason S. T. Co. 42
American Rattan & Reed Mfg. Co. 33
American Steel & Wire Co. 29
Amer. Steel Foundries 42
Anaconda Copper Mining Co. 29
Anderson Mfg. Co., A. & J. M. 29
Archbold-Brady Co. 30
Archer & Baldwin, Inc. 34
Arnold Co., The 20

B

Babcock & Wilcox Co. 31
Barbour-Stockwell Co. 31
Barrett Co., The 41
Bates Expanded Steel Truss Co. 27
Beeler, John A. 20
Bemis Car Truck Co. 39
Bennett-Field Cross Tie Co. 29
Bonney-Vehslage Tool Co. 33
Bound Brook Oil-less Bearing Co. 39
Brill Co., The J. G. 45
Buckeye Jack Mfg. Co. 32

C

Cameron Electrical Mfg. Co. 32
Canton Culvert & Silo Co. 30
Carnegie Steel Co. 26
Clark & Co. Mgr. Corp., E. W. 20
Cleveland Fare Box Co. 33
Collier, Inc., Barron G. 16
Columbia M. W. & M. I. Co. 44
Condit Electrical Mfg. Co. 10
Consolidated Car Fender Co. 12
Consolidated Car Heating Co. 33
Continental Fibre Co., The 32
Copper Clad Steel Co. 30
Cooper Heater Co., The 33
Cutter Co. 32

D

Dayton-Mechanical Tie Co. 14-15
Day & Zimmermann, Inc. 21

Page

Differential Steel Car Co., The 42
Duncan Lumber Co. 29

E

Eastern Massachusetts St. Ry. Co. 35
Electric Equipment Co. 34
Electric Ry. Improvement Co. 31
Electric Railway Equipment Co. 29
Electric Service Supplies Co. 11

F

Feustel, Robt. M. 20
Flood City Mfg. Co. 30
Ford, Bacon & Davis 20
Ford Chain Block Co. 32
"For Sale" Ads 34
Fort Pitt Spring & Mfg. Co. 40

G

Galef, J. L. 32
Galena-Signal Oil Co. 17
General Electric Co. 18, Back Cover
Gladium Co., Inc. 32
Gold Car Heating & Ltg. Co. 33
Gould, L. E. 20

H

Haskelite Mfg. Corp. 21
"Help Wanted" Ads 34
Hemphill & Wells 20
Holst, Englehardt W. 20
Horne Mfg. Co. 33
Hubbard & Co. 30

I

International Register Co., The 32
International Steel Tie Co., The 9

J

Jackson, Walter 20
Jeandron, W. J. 39
Johnson Fare Box Co. 33

K

Page

Kuhlman Car Co. 45

M

Metal & Thermit Corp. 8
More-Jones Brass & Metal Co. 22

N

Nachod Signal Co., Inc. 30
National Brake Co. 19
National Pneumatic Co., Inc. 13
National Railway Appliance Co. 33
National Tube Co. 29
Nelsonville Brick Co. 30
New York Switch & Crossing Co. 30
Nichols-Lintern Co. 42
Niles-Bement-Pond Co. 32
Nuttall Co., R. D. 28

O

Ohio Brass Co. 7

P

Page & Hill Co. 23
Pantasote Co. 37
Parsons, Klapp, Brinckerhoff & Douglas 20
Perey Mfg. Co., Inc. 33
Positions Wanted and Vacant 34
Power Specialty Co. 31

R

Railway Track-work Co. 6
Railway Utility Co. 40

Page

Ramapo Iron Works 30
Richey, Albert S. 20
Roebling's Sons Co., John A. 29
Rooke Automatic Register Co. 33

S

Safety Car Devices Co. 5
St. Louis Car Co. 27
Samson Cordage Works 40
Sanderson & Porter 20
Scaife & Sons Co., Wm. B. 31
Schutte & Koerting 31
Searchlight Section 34-35
Shanklin Equipment Co. Front Cover
Smith & Co., C. E. 20
Smith Heater Co., Peter 33
Standard Steel Works Co. 25
Standard Underground Cable Co. 21
Star Brass Works 33
Stone & Webster 20
Stucki Co., A. 42

T

Terry Steam Turbine Co. 31
Tool Steel Gear & Pinion Co. 24

U

U. S. Electric Signal Co. 30

V

Van Dorn Coupler Co. 39

W

"Want" Ads 34
Wason Mfg. Co. 45
Westinghouse Elec. & Mfg. Co. 2
Westinghouse Traction Brake Co. 4
Wharton, Jr., & Co., Wm. 30
White Engineering Corp., The J. G. 20
Williams & Co., J. H. 32
Wish Service, The P. Edw. 20
Wood Co., Chas. N. 29

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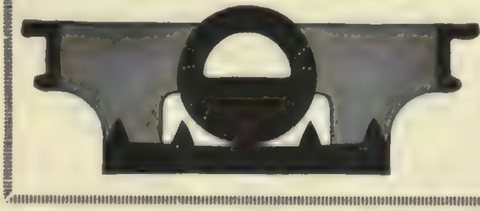

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# COMING SOON—The opportunity of the year to stimulate sales in the Electric Railway Field

THE American Electric Railway Association's Annual Convention which this year will be held at Atlantic City during the week of October 3 is the great annual gathering of electric railway officials. It is an event which vitally interests every wide-awake man in the industry. The subjects discussed and the decisions reached are high-spots in electric railway history.

This year's convention will be particularly important because the field is embarking on the biggest rehabilitation program in its history. For the first time since the war, electric railway finances are showing a decided upward trend. Track reconstruction, extensions, new rolling stock and improvements on the line, in the shops, substations and power plants will multiply rapidly from now on. These facts will form a background for discussions that will interest every electric railway man and should interest every progressive manufacturer. One of the big topics of the day is the advantage of organizing all departments of an electric railway property to help sell transportation. This movement will be stimulated at Convention time. It will help every man who can help electric railways to get more net revenue from more riders. This year's convention should be the most important that has been held since the war. In connection with this event,

## ELECTRIC RAILWAY JOURNAL

*"The Bible of the Industry"*

has every year for over a generation performed four important functions:

1. It has carried the convention to the electric railway executives who could not attend.

2. It has brought its readers fully up to date immediately before the convention on the big subjects of the day.

3. It has carried to the entire field in its advertising pages an exhibit of the electric railway equipment, apparatus and supplies produced by the most progressive and reliable manufacturers.

4. It has helped these manufacturers carry a selling message to the entire industry in a manner that has left a lastingly favorable impression.

*This year Electric Railway Journal will outdo past service records.*

## 1921
## Convention Issue

Electric Railway Journal
will bear the title

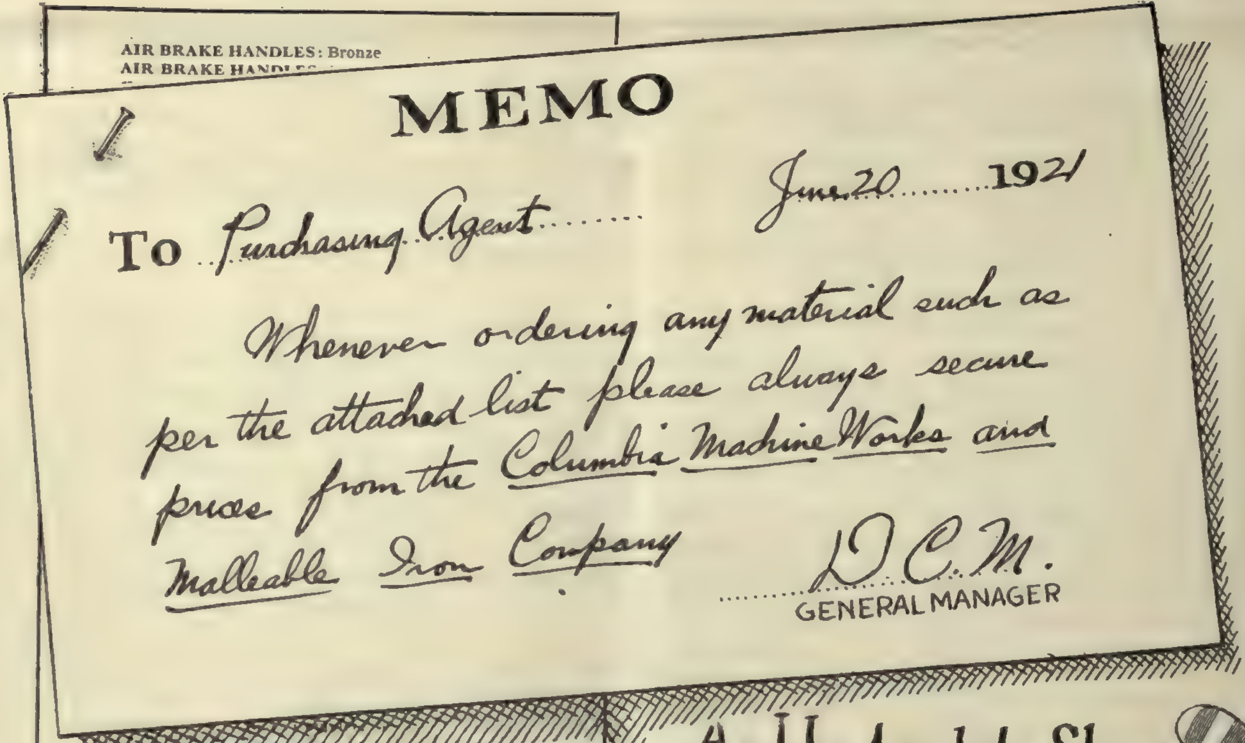
## "Better Salesmanship in Transportation"

*"How All Departments Can Help"*

A splendid opportunity to make the advertising section harmonize with the text pages. Every piece of equipment can help an electric railway company win or lose customers. Attractive rolling stock, comfort, smooth track, no delays—these and other elements of business-building have their controlling factors in the cars, on the roadway or overhead, in the power plant, in the shops or in the offices. Can the service you render an electric railway help it sell more rides more profitably?

Electric Railway Men — the big men in the field — are waiting to hear you tell them in the Annual Convention Issue of the *Electric Railway Journal.*

**ELECTRIC RAILWAY JOURNAL, Tenth Ave. at 36th St., NEW YORK**

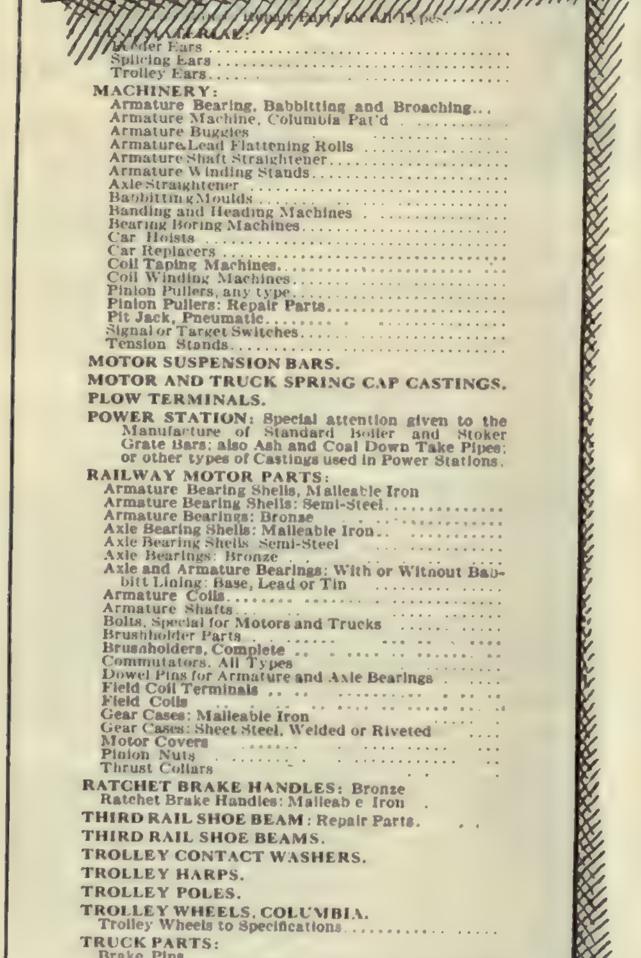


MEMO

To Purchasing Agent June 20 1921

Whenever ordering any material such as per the attached list please always secure price from the Columbia Machine Works and Malleable Iron Company

D.C.M.
GENERAL MANAGER



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The general manager who is seeking the utmost economy will not blindly stick to a policy of doing all kinds of work in his own shop or at that of some small local concern, when there is immediately available a most modern and completely equipped shop, specializing in electric railway work.

We can supply many standard articles directly from stock, such as air-brake and controller handles, trolley wheels and poles, gear cases, etc. We can make anything special from your own specifications, on short notice.

*Compare our prices with your own shop costs.*

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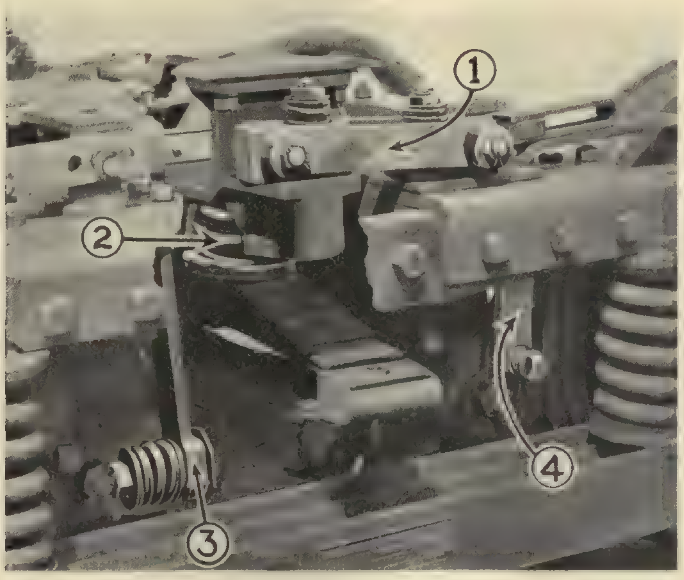

**Smooth and Comfortable Riding Action of This High-Speed Truck Is Result.**

**1** The BOLSTER GUIDE prevents contact between bolster and transoms under motor and brake pressure, and thereby eliminates destructive and annoying vibrations.

**2** The GRADUATED SPRING SYSTEM consists of an easy acting coil spring on top of a slower acting elliptic spring under each end of the truck bolster. When the supported weight is sufficient to compress the coil spring so that its cap and seat contact, from that point on action is furnished by the elliptic spring. Thus equally good riding is obtained under both light and heavy loads.

**3** As its name implies, the SIDE SWING DAMPENER prevents excessive side swing. Sufficient lateral motion of the bolster and carbody is permitted to provide easement at curves.

**4** "HALF-BALL" BRAKE HANGERS are noiseless, self-adjusting to wear and self-cleaning. They keep shoes in proper alignment and, consequently, reduce uneven shoe wear. The half ball ends are case hardened.

*These features together with the use of Brill solid-forged sideframes are responsible for the popularity of Brill 27-MCB Trucks under High-Speed Interurban Cars.*

**THE J. G. BRILL COMPANY**
PHILADELPHIA, PA.

AMERICAN CAR CO. — ST. LOUIS MO.
G.C. KUHLMAN CAR CO. — CLEVELAND, OHIO.
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*The building of machinery to secure greater motor power within the same car space is an accomplishment of exceptional importance in electric railroading.*

G-E 247 Ventilated Motor

## Make Your Present Cars Do More Work

Commutating poles and self-ventilation were not unknown to the earliest inventors of electric railway motors. But it was not until General Electric Company engineering was asked to meet the severe conditions encountered in congested city service that these principles were converted into successful practice.

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Armature Coils as Prepared for Supply Shipments.

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*Long Distance Record*
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Westinghouse
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The efficiency and economy of your shop equipment is just as important as that of your rolling stock. Increased service and subsequently greater revenue can be obtained by the use of modern maintenance equipment.

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With Westinghouse Arc-Welding equipment you can increase the scope of your repair work and keep down costs by reclaiming broken gear cases, truck frames, motor frames and all metal parts of cars and car equipment.

*Standardization on* Westinghouse equipment for your shop carries with it the same advantages of interchangeability that you have found so important with transportation equipment—stocks of repair parts are reduced to a minimum, and standardization results in quick repairs thus assuring maximum operation of revenue equipment.

W
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East Pittsburgh, Pa.
Offices in all Principal American Cities

Westinghouse Motors on Machine Tools

Welding Broken Trucks and Gear Cases

*Vol. 58, No. 5* New York, July 30, 1921 *Pages 157 to 190*

# Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

## *Contents*

### Practices in Constructing the Overhead in Detroit

Equipment employed is largely of standard design. Earth-boring machine speeds up work of digging holes and setting poles. Backbone construction used on all curves. Special strain anchors on trolley and corner construction on feeder cables are features.......................................Page 159

### Commission Popular in Keystone State

Pennsylvania, with its less rigid commission laws and decisions but with the largest number of public utilities of any state, is regulating very effectively. Safety work an important duty. Classification of Pennsylvania utilities...... Page 163

### Successful Use of Welded Joints in Baltimore, Md.

W. W. Wysor tells of the notable immunity from broken joints which has been experienced in Baltimore, where the welding is not carried across the entire width of the joint plate.......................................Page 170

EDITORIALS .............................. 157
MERCHANDISING TRANSPORTATION............ 166
TOOTH CONTOUR OF THE HELICAL GEAR........ 168
CONVENIENT TYPE OF PIT JACK.............. 168
PORTABLE SUBSTATION WITH COLLAPSIBLE CONSTRUCTION ........................ 169
TYPE OF INTERURBAN CAR FOR GERMANY...... 169
LETTER TO THE EDITORS.................... 171
HAVANA RAILWAY HAS ITS TROUBLES......... 171
STATUS OF POWDERED FUEL.................. 172
ELIMINATION OF WASTE.................... 173
CORRECTION IN A. S. T. M. REPORT............ 174
IOWA ASSOCIATION MEETS AT LAKE OKOBOJI... 174
ENGINEERING FOUNDATION PUSHES HIGHWAY RESEARCH..................... 174
AMERICAN ASSOCIATION NEWS............... 174
Bus Committee Meets.
Stores Accounting Report Completed.
Convention News.
Committee on Standard Classification.
American Electrolysis Committee.
NEWS OF THE ELECTRIC RAILWAYS............ 176
FINANCIAL AND CORPORATE.................. 180
TRAFFIC AND TRANSPORTATION............... 183
LEGAL NOTES............................. 186
NEW PUBLICATIONS......................... 186
PERSONAL MENTION........................ 187
MANUFACTURES AND THE MARKETS........... 189

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Advertising Index—Alphabetical, 38; Classified, 32, 34, 36; Searchlight Section, 30-31

# Shurvent

## Renewable Fuses

Ferrule Type
*Shurvent* Renewable Fuse

A new fuse, and the only renewable fuse with a scientifically designed venting path, that is used for venting only.

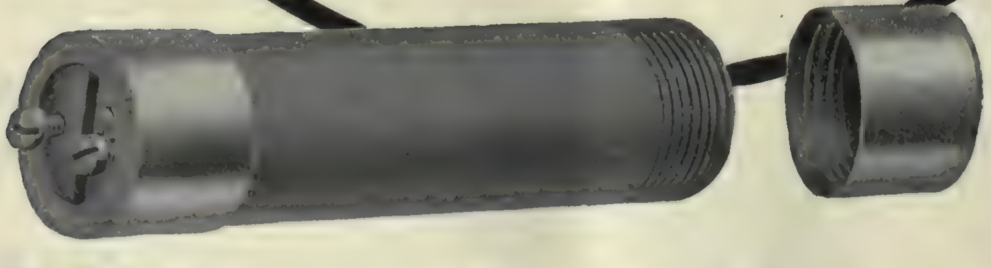
This positive vent, or *Shurvent* construction is not dependent for satisfactory operation on "hit-or-miss" venting along the threads, but provides a separate path to take the hot gases of the blown fuse and deliver them into the outer atmosphere cool and harmless.

*Shurvent* Fuses are fully approved by the Underwriters' Laboratories in all capacities up to, and including, 600 amperes, 250 and 600 volts.

Write for Folder 4472 describing these new fuses in detail.

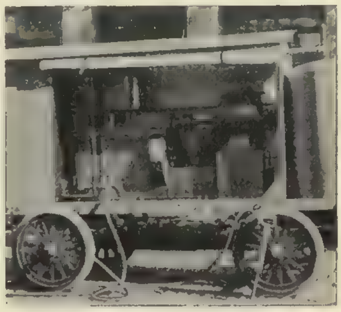
**Westinghouse Electric & Manufacturing Company**
East Pittsburgh, Pa.

Knife-Blade Type
*Shurvent* Renewable Fuse



# Westinghouse

Wherever pneumatic devices are used, as in Car Barns, Repair Shops, Power Plants and for Maintenance of Way.



# Westinghouse-National Air Compressors

THE Traction Industry has many important uses for compressed air in connection with "back shop" activities, track work, signal systems, etc.

Westinghouse-National Compressors are designed exclusively for this line of industrial service and various types, depending on local conditions and requirements, have been in operation for years with perfect results in many of the largest and busiest traction terminals in the country.

We supply both stationary and portable motor-driven types which may be equipped either with direct or alternating current motors in various voltages or phases. All capacities up to 550 cu. ft.

Westinghouse-National Compressors are especially noted for their rugged, compact construction (saving floor space), low power consumption, durability, and mechanical fitness to operate smoothly under all conditions with minimum attention.

**Send for air compressor literature and free engineering advice**

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*General Office and Works, Wilmerding, Pa.*

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LOS ANGELES
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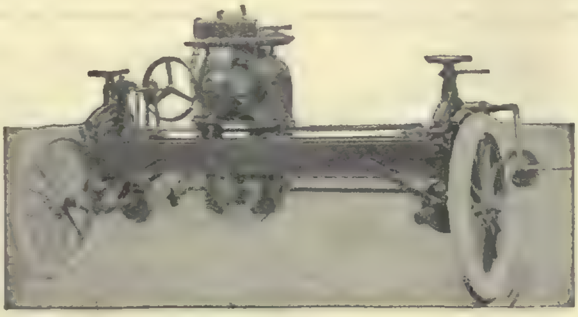
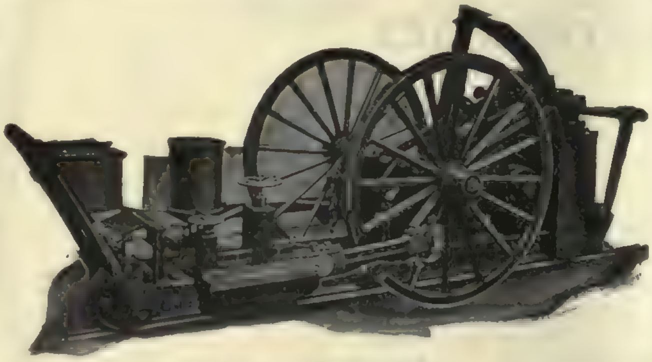
WASHINGTON

# Save Both Track and Cars



*Universal Track Grinder*



*Reciprocating Grinder*

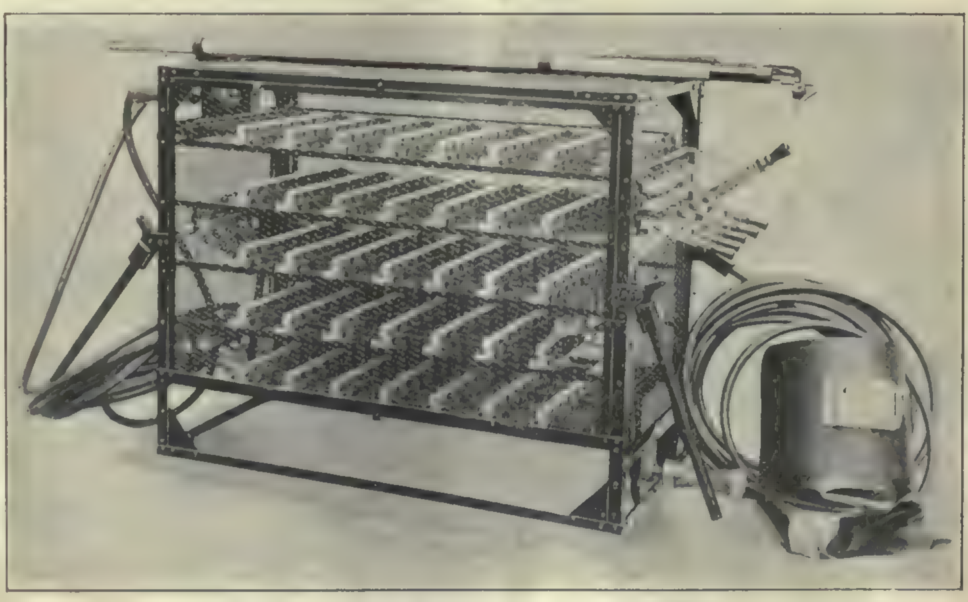
## *by welding and grinding*

Every bad joint and every corrugation are constant sources of double loss; they lead to an accelerated rate of track depreciation and to a serious wear and tear on rolling stock.

Both are needless since the development of welding and grinding as an essential part of track maintenance. It will save you money to double up on this work now.

*Increase your equipment for efficient maintenance.*

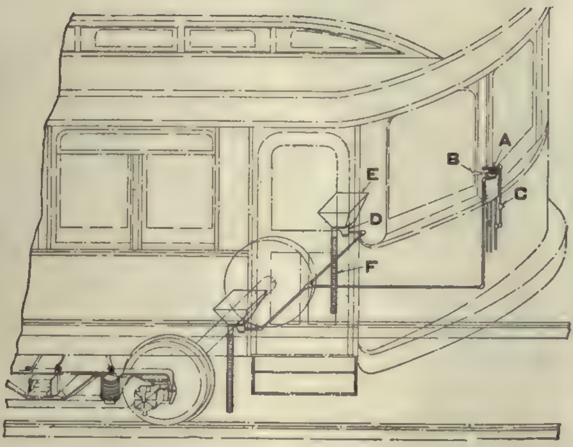
**Railway Track-work Co.**
**3132-48 E. Thompson St.**
**Philadelphia, Pa.**



*Ajax Electric Arc Welder*

# O-B Air Sander Equipment

## A positive sanding system that is economical of air



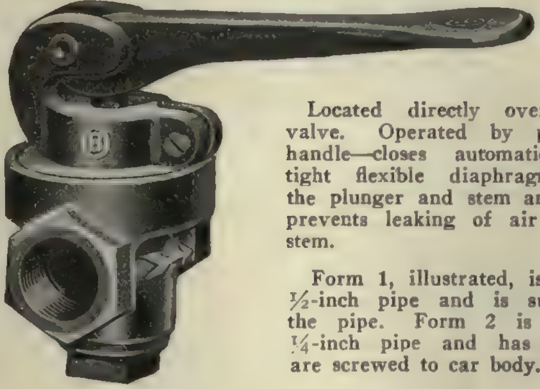
How O-B Air Sander Equipment is installed. "B" is engineer's valve handle. "E" is a hopper which may be built in any convenient point near the wheel.

### "D"—O-B Air Sand Trap

A compact trap which fits in any corner where it has to go. Won't let sand through except under air pressure. Full, curved passages let sand flow freely under pressure. 2-inch, sherardized, clean-out plug in bottom. Threaded for ¼-inch air line. Spout of Form 1, illustrated, is equipped with studs to hold 2-inch sander hose. Form 2 spout is threaded for 1-inch pipe coupling.

### "A"—O-B Air Sander Valve

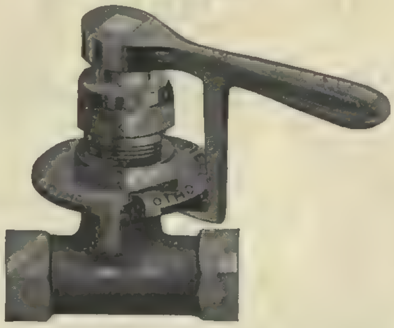
**Diaphragm Type—Patented**



Located directly over engineer's valve. Operated by pressing the handle—closes automatically. Air-tight flexible diaphragm separates the plunger and stem and absolutely prevents leaking of air around the stem.

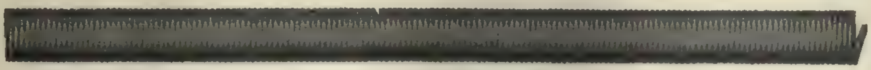
Form 1, illustrated, is tapped for ½-inch pipe and is supported by the pipe. Form 2 is tapped for ¼-inch pipe and has lugs which are screwed to car body.

### "A"—O-B Independent Air Sander Valve



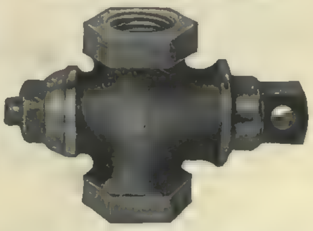
Opened or closed by turning handle. Tapered seat gives close regulation of air flow and positive shutoff. Handle is removable for double end operation, but can be taken off only when valve is closed.

### "F"—O-B Wire Sander Hose



Can be located to drop sand on the rail always—even on curves.

### "C"—O-B Air Reducing Valve



Limits, to any desired pressure, the amount of air which flows when the sander valve is wide open.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

## The Ohio Brass Co.

**Mansfield, Ohio**

**New York Philadelphia Pittsburgh**
**Chicago Los Angeles**
**San Francisco Paris, France**

***Products: Car Equipment; Trolley Material; Rail Bonds; High Tension Porcelain Insulators; Third Rail Insulators.***

## A Break Here Would Cause Quite a Tie-up— But San Francisco Uses

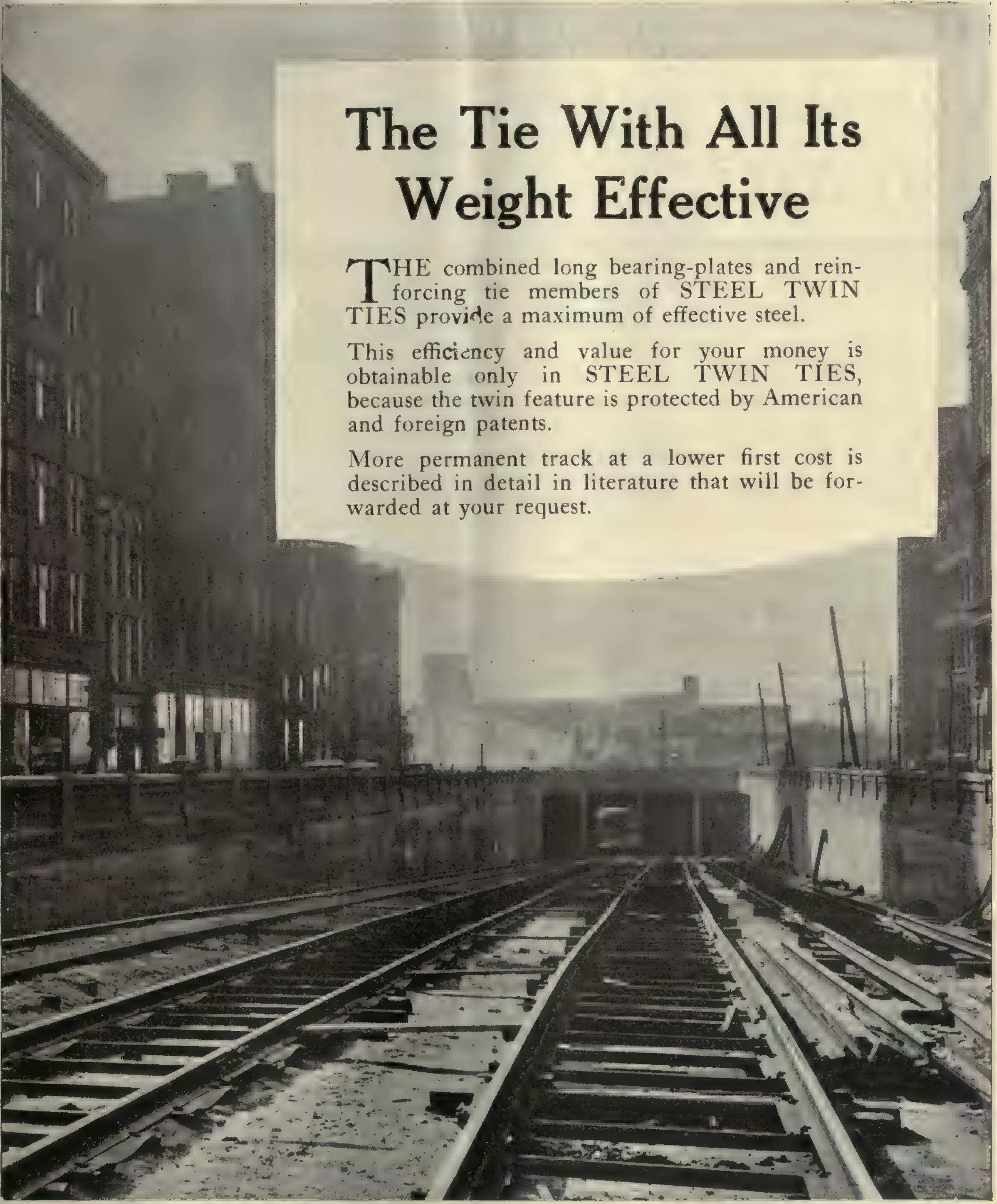
# Phono-Electric

And San Francisco seldom has a tie-up in traffic. Seattle uses Phono-Electric Trolley Wire, too, on sharp curve sections, as shown in the circle. Something tougher and more durable than copper is needed to take the grinding at the curve, or the smash of the dewired wheel.

For such situations the obvious thing to do is to use a smooth-running trolley wire that stays up two or three times as long as copper. That means Phono-Electric. Start by protecting your important points with Phono-Electric Trolley Wire.

## Bridgeport Brass Company

Bridgeport 2142 Connecticut



# The Tie With All Its Weight Effective

THE combined long bearing-plates and reinforcing tie members of STEEL TWIN TIES provide a maximum of effective steel.

This efficiency and value for your money is obtainable only in STEEL TWIN TIES, because the twin feature is protected by American and foreign patents.

More permanent track at a lower first cost is described in detail in literature that will be forwarded at your request.

# Steel Twin Tie Track

**THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio**

*International Steel Twin Ties manufactured and sold in Canada by Sarnia Bridge Co., Ltd., Sarnia, Ont.*

# *Will your present lubricant pass this test?*

Give Tulc a trial under the most adverse conditions and a number of characteristics for which this ideal lubricant is noted will become apparent.

You'll find, for example, that Tulc lubricates perfectly with no loss. You'll find that it does not harden nor gum. That it leaves no residue. That it does not grow rancid nor corrode the metal.

These are some of the reasons why Tulc will save 40% of your oil bills—an average of 50% of labor in applying—a large proportion of repair bills.

Why not get complete data on Tulc? You'll find it in our Booklet "Results," a copy of which will be mailed free, on request. Write today.

**"Overall Specialists"**

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—*show* you how and why Tulc should be used. They get results—real money-saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

**The Universal Lubricating Co.**

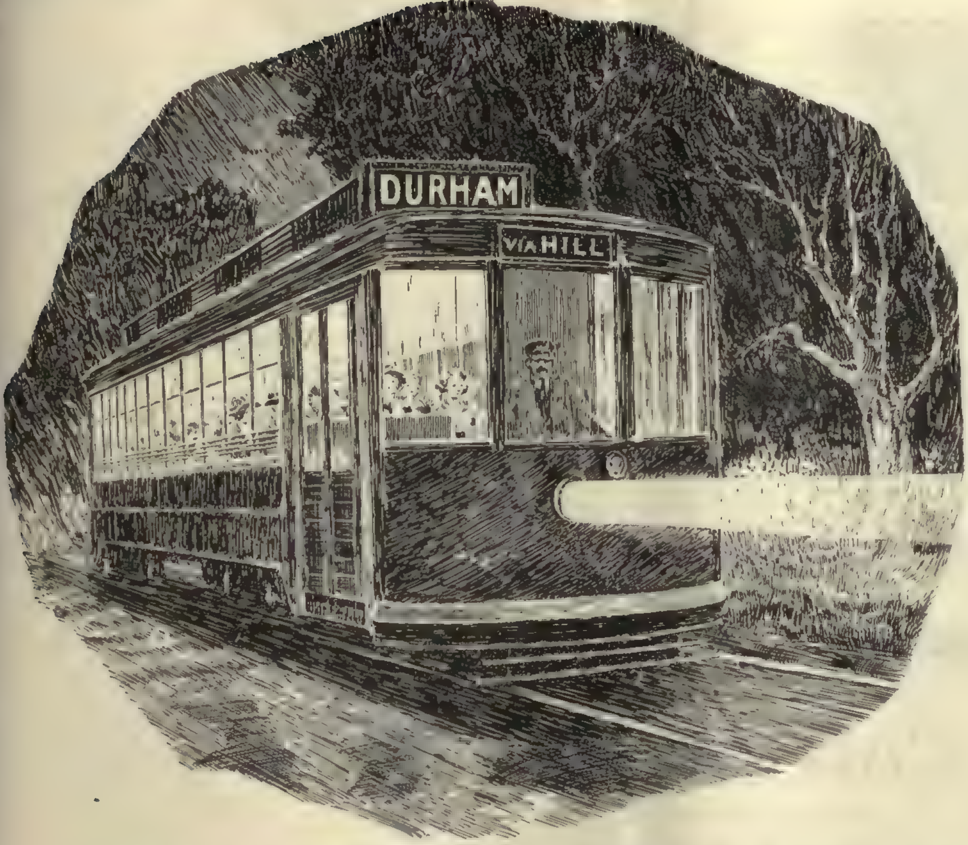
**Offices: Schofield Bldg. Works: Sweeney Ave.**

**Cleveland, Ohio**

**TULC**

**A LUBRICANT**

**—scientifically and accurately compounded to reduce lubricating costs**



*Riding in the Night*

**25 PER CENT DO IT**

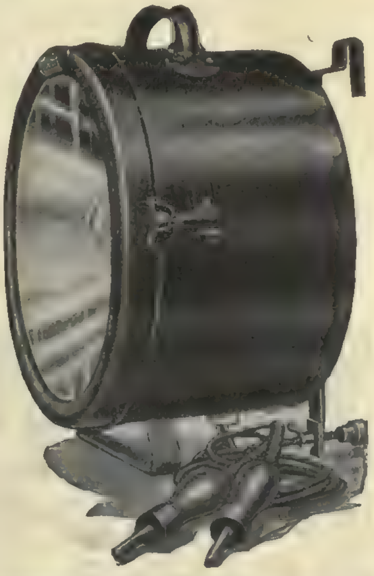
There would be more night riders if you could sell them on better service. By eliminating uncertainty, identifying cars and their routes, you secure the night riders' good will. They will ride more often on cars that unmistakably advertise their routes and destination points—that look as illuminated from the outside as they do inside.

Golden Glow Headlights identify your cars in general and make it easier for the motormen and opposing traffic.

Keystone-Hunter Illuminated signs easily identify your cars in particular at a distance convenient to the night rider.

**Write for data sheets.**

Keystone-Hunter Illuminated Signs (They're white by day).



Golden Glow Headlights for either portable or permanent installation on the dash.

**ELECTRIC SERVICE SUPPLIES Co**

*Manufacturer of Railway Material and Electrical Supplies*

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

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Monadnock Bldg.

*Branch Offices: Boston, Scranton, Pittsburgh*
*Canadian Distributors:* Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Winnipeg, Vancouver

*Bound Brook Oil-less Trolley Wheel Bushings are now used by two thirds of America's electric railway systems.*

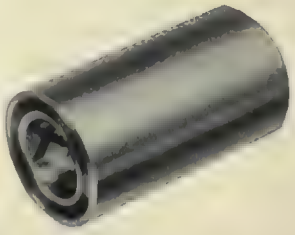
# For Low Cost Maintenance

THE fundamental of trolley wheel maintenance isn't adjustments—nor replacements. It's *lubrication.* That's why Bound Brook Oil-less Bushings are so necessary.

Solidly packed in a latice grooved core, the specially prepared graphite in this bushing separates the rubbing surfaces with a lubricating cushion—a positive protection against cohesion and excessive wear. Because of this unique construction the wear is slow and gradual thruout—the lubrication in most cases outlasting the wheel itself.

Such smooth functioning reduces wheel vibration, makes perfect transmission possible and reduces burnt shunts and other harp troubles to a minimum.

Give your wheels a chance to show service. Provide against excessive wear by always specifying genuine "Bound Brook" Oil-less Trolley Wheel Bushings.



## Bound Brook Oil-less Bearing Co.

*Specialists in the manufacture of Oil-less Bushings for more than a third of a century*

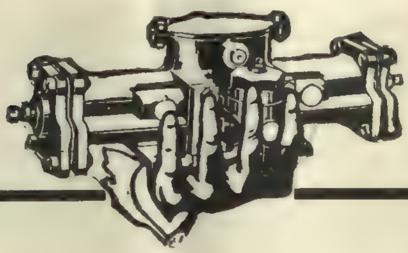
**Bound Brook, New Jersey**

Detroit Office: 1723 Ford Bldg.

**BOUND BROOK**

**OIL-LESS TROLLEY WHEEL BUSHINGS**

*Modernize!*



*Pneumatize!*

# "Figure yourself", as the Frenchman says, the natural deductions from the following situation:

The electric railway prospect of today has his house cleaned with a motor-operated vacuum cleaner; his clothes washed and laundered by electrical machinery; his phonograph wound up by a motor; his bread toasted by electricity almost instantaneously while his coffee may have come out of a motor-driven grinder. Then his wife whisks him to the station in an automobile fitted with a self-starter.

Just what will be his impression, then, if the cars of the *electric* street railway in town are run on the same hand-pull and hand-signal basis as in the days when there were no such labor-saving appliances as those named?

To put "1921" pep into "1900" cars, confer with us on the application of

## National Pneumatic

Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

*Manufactured in Canada by*
**Dominion Wheel & Foundries, Ltd.**
**Toronto, Ont.**

National Pneumatic Company, Inc.
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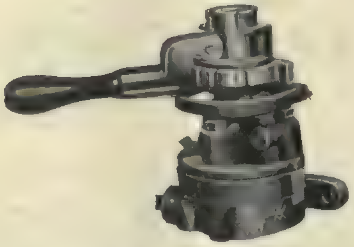
Edison Bldg., Chicago
Works: Rahway, N. J.



Under the Motorman's right hand

Under the motorman's right hand—a small thing—the valve, but big enough to effect the safety of a big modern car.

It needs only a few drops of lubricant—NOT A SMALL THING—because big enough to affect the operations of that valve and all that it controls.

And for this reason great care should be taken in the selection of the right lubricant for motormen's valves.

We have the right Lubricant—TEXACO 921 TRANSMISSION LUBRICANT.

It has the right consistency for the work, so that it does not pack in the grooves, or on the valve seat and always flows back to the working surfaces. At the same time it resists warm weather so that it does not thin and run off into the air pipes, leaving the valve seats and spindle unlubricated.

Keeps the leathers soft and pliable and free from cracks; does not gum or make valves work stiff.

**Texaco 921 Transmission Lubricant**

contains no artificial stiffener. It is homogeneous; does not separate in warm or cold weather and will not form any undesirable deposits of decomposition.

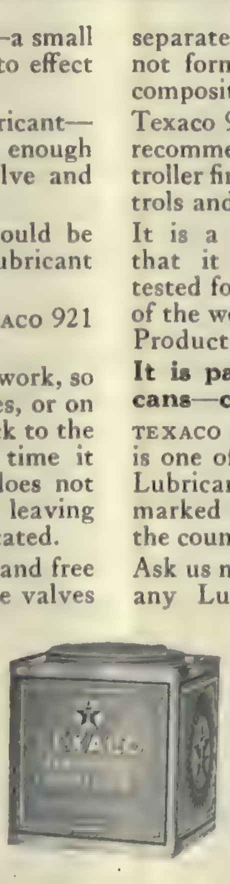
Texaco 921 Transmission Lubricant is also recommended for brake cylinders, controller fingers, pneumatic and magnetic controls and car door engines.

It is a Texaco Lubricant—which means that it is carefully refined, thoroughly tested for the work, and guaranteed by one of the world's leading refiners of Petroleum Products.

**It is packed in 5 lb. handy screw top cans—clean and convenient.**

TEXACO NO. 921 TRANSMISSION LUBRICANT is one of the many Texaco Street Railway Lubricants which are meeting with such marked success on street railways all over the country.

Ask us more about this Lubricant, or about any Lubricant for rolling stock, power plant, shop, any equipment whatsoever anywhere.



*There is a Texaco Lubricant for every purpose.*

TEXACO

THE TEXAS COMPANY
DEPT·R·J·17 BATTERY PLACE·NEW YORK CITY
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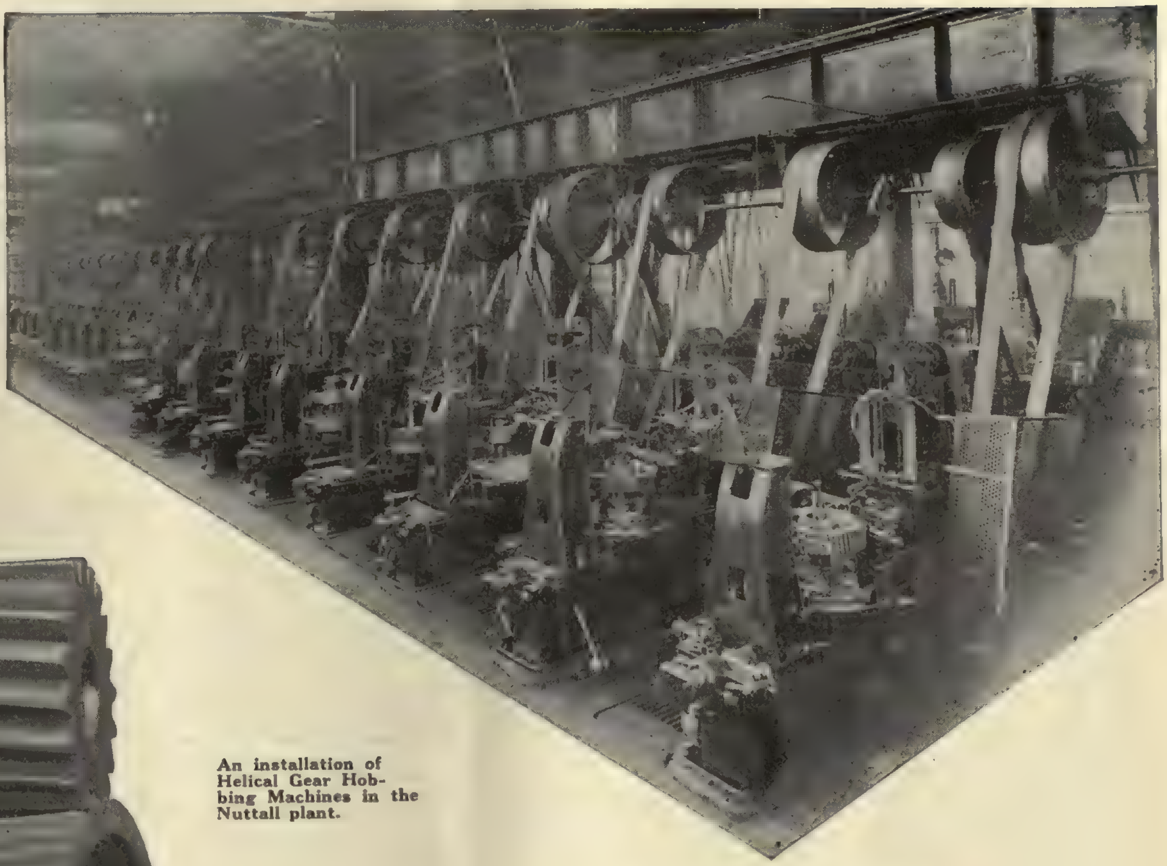


An installation of Helical Gear Hobbing Machines in the Nuttall plant.

# Gear Vibration Costs Money

Vibration is a very destructive agent. It quickly destroys operating equipment, thus causing heavy maintenance expense.

Helical Gears, if properly designed and constructed, prevent vibration and noise.

The Nuttall Company has the distinction of having designed and made successful railway helical gears. This company's facilities for turning out A No. 1 helical gears are ample to meet any demand.

Above is shown a part of a large installation of special Nuttall Helical Gear Hobbers. More than 25,000 railway helical gears and pinions have been cut with these hobbers.

*Write for Bulletin No. 28.*

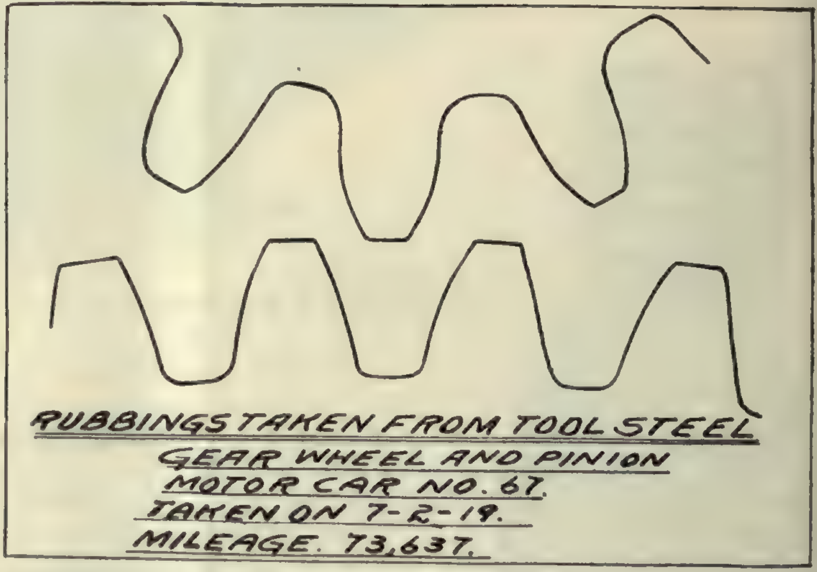
**R.D.NUTTALL COMPANY**
**PITTSBURGH PENNSYLVANIA**

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products

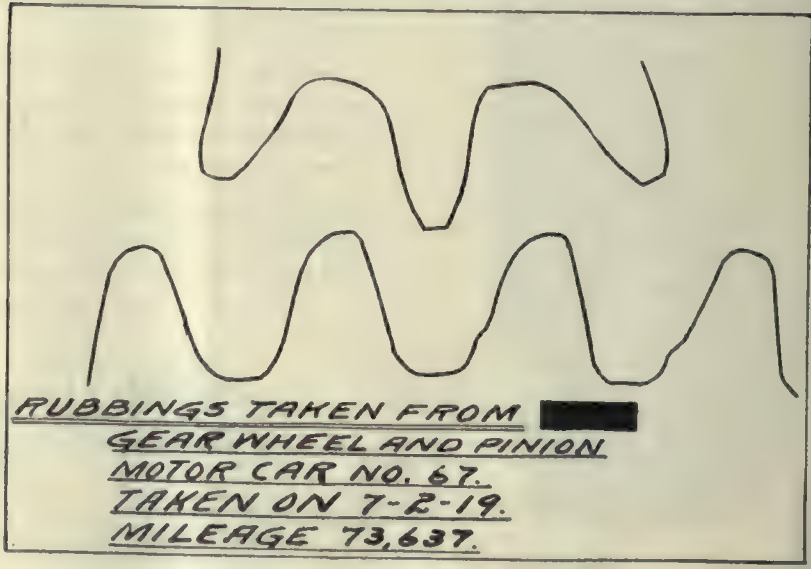
**Nuttall**

# INDIA SAYS

T. S. Q. means this



RUBBINGS TAKEN FROM TOOL STEEL
GEAR WHEEL AND PINION
MOTOR CAR NO. 67.
TAKEN ON 7-2-19.
MILEAGE. 73,637.



RUBBINGS TAKEN FROM [redacted]
GEAR WHEEL AND PINION
MOTOR CAR NO. 67.
TAKEN ON 7-2-19.
MILEAGE 73,637.

Comparison of
"Tool Steel" and ordinary gears
and pinions tested under
the same car

*Test at Calcutta, India*

"Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

Tool Steel Gear & Pinion Co., Cincinnati, Ohio

The World's best Lubricants

GALENA QUALITY

# A Physical Impossibility

## To produce high grade lubricating oil from low grade crude oil

Of the total crude oil storage in the United States there is only a trifle over two per cent of the high grade, paraffine base crude, suitable for producing the class of lubricants capable of filling railway lubrication requirements. Low grade crudes must necessarily produce low grade lubricants; low grade lubricants invariably render low grade service.

TRIGRAM G S O C TRADE MARK

## Galena Oils

are made from only the highest grade stocks, reinforced by Galena compounding processes. They are built especially for railway service and have the strength and vitality to carry the loads and hold their protective film under the most severe service conditions.

Statistics from the records of hundreds of American railways testify to their economy as well as their efficiency and have gained for them their reputation as the world's best railway lubricants.

*Galena Quality Is Our Bond*
*and Your Security!*

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
*Offices in all principal American Cities*
LONDON BUENOS AIRES PARIS

GALENA SERVICE

*There is no surer way of keeping cars off the pit than by maintaining the original equipment quality of their wearing parts*

## A Time and Trouble Saver for the Purchasing Agent

**The G-E Renewal Parts Catalog for car equipment makes it easy to order new parts with the positive assurance that such parts are exact duplicates of those supplied on the original equipment. Each part is pictured, titled and numbered.**

**In this catalog, compact yet complete, there is a separate bulletin for each piece of apparatus. It is always up to date, for as changes are made in the equipment, new sheets are sent out to be inserted in the loose leaf binder.**

**This Renewal Parts Catalog service is sent free to users of G-E car equipment. No purchasing agent can afford to be without it.**

# General Electric Company

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

10-203

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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*Volume* 58 New York, Saturday, July 30, 1921 *Number* 5

## Eliminate Waste in the Electric Railway Business

IT MIGHT have been expected that the first work of the Federated American Engineering Societies, after Mr. Hoover was elected its president last fall, would be a study of the reduction possible in waste. When Mr. Hoover was called upon during the war to act as food director, not only of the United States but of a considerable part of the world, the question of waste was one which particularly attracted his attention. With his training as an engineer he recognized that waste represents not only energy which is lost but energy which would be productive if properly applied. In consequence, as food director he declared war against waste in food by issuing his famous "clean platter" and other regulations, which were gladly followed by the people during the period of food scarcity. A study of industrial waste offers a much broader opportunity for saving than even waste in food. The electric railway industry was not one of those especially studied by the committee, but many of the conclusions reached in the report just completed apply with almost equal force to electric railways.

Fortunately electric railways are largely free from very great seasonal variations in their business. With the exception of roads serving summer resorts, the business throughout the year has a fair regularity, but it is possible that something might be done more than at present toward a definite plan of supply of men to help out the forces of the summer roads and toward adjusting the work of the track forces on an eight months' if not a twelve months' basis. A more fruitful opportunity for waste reduction probably lies in the lessening of the turnover percentage. The report estimates the annual avoidable labor turnover in the metal trades at 100 per cent and the cost of each "separation" as from $50 to $250 each. If the first figure in the electric railway industry is taken as only 50 per cent and the cost of training is taken as only $50, the cost of annual turnover in the electric railway industry would amount to $6,000,000 a year. Probably 50 per cent is too large an estimate now, though it probably would not have been five years ago. However, much can be accomplished along these lines. Standardization is another point to which the report calls particular attention, and it even mentions the electric railways as possibly being able to do more than they are now doing in car standardization.

There are undoubtedly other ways in which waste and duplication, which is the same as waste, can be reduced on electric railway properties. Each manager might well consider what he can do on his own property, as he not only serves his own company but increases the community wealth in any saving which he may be able to effect.

One practice, insignificant perhaps in the amount of money involved as compared with some of those mentioned in the report but nevertheless involving the same principle, is common in the industry and might be mentioned here. This is the plan followed by some companies of circularizing the industry for information which is already available, either in the reports of commissions, the data on file in the office of the association or through existing publications. Railway companies realize that when information of this kind is solicited by this paper the material is published, so that it is available for everybody and the company should be relieved from other requests for similar data. Hence, requests for duplication of this information really come under the ban of Mr. Hoover's principle against waste. In fact, a good principle to follow is that work which is being well done by one existing agency need not be duplicated by another.

## A Study in Wage Readjustment

REDUCTIONS in wages commensurate with the reduced cost of living are to go into effect in New York as a result of negotiations between management and men. In the case of the Interborough Rapid Transit Company the saving is estimated at $2,600,000 for the year. This is a sum whose beneficial effect is likely to be overestimated. In consequence the management of the company has found it necessary to issue a warning as to the probable effect of this saving. The solution of the transit problems in New York lies in making the investment of the company and the city self-supporting, so that, as President Hedley of the Interborough says, the capital required by the city's growing transit needs may be commanded. The wage reduction now brought about cannot possibly have such effect. The same comment also holds true of the savings effected through the cut in wages on the Brooklyn Rapid Transit System. In the case of that property, however, no statements appear to have been bandied about by self-seeking politicians in regard to the probable effect of the saving there.

These are the purely monetary aspects of the matter. There is another side to this question, however, that is more significant in its way than the help these savings in dollars and cents will be to the companies still battling against the odds imposed by the 5-cent fare. That side is the way in which the readjustment downward was brought about. The negotiations were conducted by the companies direct with committees of their own men. No rancor as to means or methods attended the conferences in either case. The companies put the decrease before the employees in the spirit of give and take, the same that prompted the companies to disregard wage agreements in the period of advancing prices when the helping hand was extended to the men. The employees, on their part, met the companies in the same spirit. As Vice-President Porter of the Brooklyn City Railroad said, the spirit in which the negotiations were conducted was most gratifying and showed a keen appreciation of actual conditions. Moreover, they are significant of what men and management can accomplish under the plan of employee representation in which both sides are free to proceed without being embarrassed by interference from outside sources.

## Clear Analysis of the Duties of a Common Carrier

A CLEAR analysis of the duties of a common carrier is contained in the decision rendered on July 21 by Judge John E. Keeler of the Connecticut Superior Court in the case of some of the jitney bus drivers who could not understand why they should be stopped from operating. The case came up through the plea for an injunction restraining the Public Service Commission from carrying out certain laws enacted at the last session of the Legislature. In deciding this question adversely Judge Keeler answered two kinds of arguments commonly heard in cases of this kind. One of these is from those citizens who find it difficult to understand why an added transportation facility should be abolished.

"If it was not a good thing," they argue, "people would not patronize it. Competition ought to be desirable. It will keep each transportation agency up to the mark." The other line of argument often put forward in cases of this kind is based on the question of personal liberty and runs somewhat as follows: "Why should not the public carrier business be open to all? And why can a man be ruled off the highway because he runs the bus, but be free to use it if he runs a truck or private car? Why should a commission give a license to operate on the streets to a trolley company and refuse the same permission to a bus company? This is arbitrary power exercised in violation of constitutional rights."

Now all these questions can be answered very easily and simply if the nature of the common carrier business is understood. It is not like an ordinary mercantile business where the proprietor can open or close his shop whenever he likes, keep what goods he wants and sell for any price he chooses. A common carrier cannot do any of these things. He must agree to provide a service at times both when it is not profitable to do so as well as when a profit can be earned, and he is limited as to the charges which he can make for that service. His is not a private business. It is a quasi-public undertaking though conducted as a private corporation for profit, and as the nature of the business is such that it can be given much more cheaply if carried on by one concern than by a number, the authorities are acting in the interests of the public when they confine the service to one company and require it to do the thing right. Hence, action by a commission in favoring one concern and forbidding another is not an arbitrary exercise of power, except to the extent that any decision between individuals as to appointment to do certain work is arbitrary. The state requires the commission to make a decision of this kind. Finally, action by a commission in a case of this kind is in the interests of the public as a whole, so that it is a legitimate exercise by the state of its admitted police power.

Elements in Connecticut with a stake in the jitneys are naturally lambasting the Public Service Commission over the law which Judge Keeler was asked to construe. In this assault they are aided by all the avowed enemies of the Connecticut Company. As a matter of fact, the law is harder on the Connecticut Company than it is on the jitneys. The commission has ruled that where railway service is adequate or can be made adequate to the needs for transportation, there is no room for the jitney. It has also declared, at least in effect, that where the trolley furnishes the transportation, it must make good or go down in defeat. The railway knows then that it is fighting for its life as never before, as witnessed by the heroic efforts which it is making to increase its trolley service and to supply bus facilities where the commission has indicated that this is what is expected of it.

The situation is, in fact, fraught with greater danger to the Connecticut Company, with its vast investment in immovable assets, than it is to the bus owners, whose property can quickly be converted to other uses. In an excess of zeal to guard what seem to them to be their own best interests, the jitney operators appear to have lost sight entirely of this fact.

## Due Process of Law Impossible in Public Rate Decision

"THERE is no way in the world for a public utility to be heard before the mass of the public who are going to vote to fix rates, and that is a part of due process."

A United States District judge is quoted as using these words in summing up, in a recent case, the inequity of settling by popular vote the matter of public utility rates. Whether it formed part of the formal decision or not, the statement quoted is undoubtedly true. The futility of submitting a question of this kind to popular vote has been almost universal. There have been only two or three instances in which approval has been granted. Hence, appeal to the courts based directly on guarantees of the Constitution has been quite frequent.

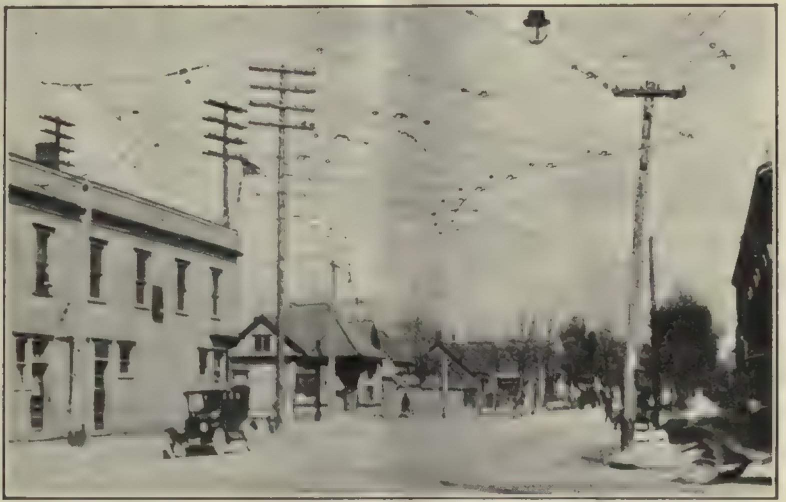
While the courts have very clearly stated the law regarding the confiscation of property, none of the decisions that have come to our attention has referred to the difficulty of obtaining a public-wide hearing. Those railway companies that have attempted to gain public approval of an increase at the polls have in many cases utilized every known means of getting an understanding of their case to every one. Yet the result was the usual disappointment. This can only be explained by the fact which is outlined clearly in the expression quoted above.

Publicity of a constructive and pleasing nature undoubtedly can be made to accomplish much in improving the general attitude toward a traction company, but history has demonstrated that the public will not readily vote to pay increased utility rates in response to the somewhat intangible plea that the utility will thereby be able to improve its service. This points to the desirability, in drawing up future franchises, of avoiding any condition on fare changes requiring popular approval at the polls, and of declining to acquiesce in the proposal of any city council, where it has full authority in itself to raise fares, to sidestep responsibility by passing the question on to a vote of the people.

Even in those sections of the country committed to the principle of the referendum, this argument would still apply. A rate of fare is a business proposition, and not of the nature of laws for the referring of which to the general public there may be many reasons not applicable to utility rate questions.

# Constructing the Overhead in Detroit

### Equipment Employed Is Largely of Standard Design—Earth-Boring Machine Speeds Up Work of Digging Holes and Setting Poles—Backbone Construction Used on All Curves—Special Strain Anchors on Trolley and Corner Construction on Feeder Cables Are Features

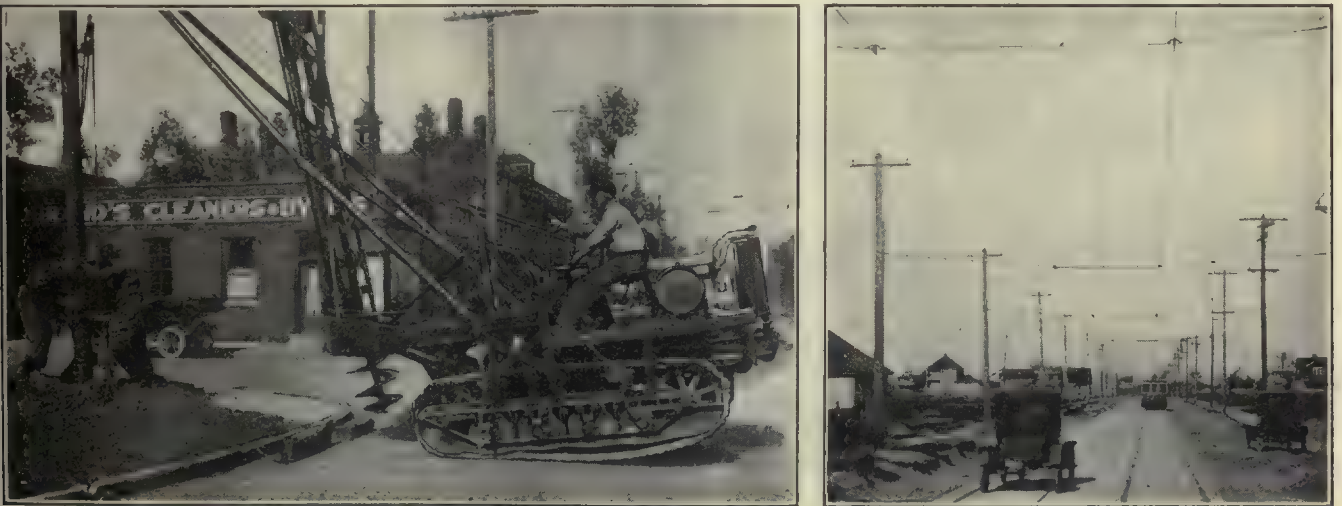


TYPICAL APPEARANCE OF THE OVERHEAD AT SPECIAL WORK LOCATION, SHOWING BACKBONE CONSTRUCTION

ADHERENCE to the use of standard fittings and materials, substantial and permanent nature of the construction and the use of labor-saving devices and methods characterize the overhead work of the Detroit Municipal Railway, just as they were pointed out in an article in the issue of July 23, to be the special attributes of the track construction. Following the requirements of a city ordinance, tubular steel poles are used within a circle approximately 2 miles in radius, with the center at the City Hall, except where wood poles are already existing. Wherever possible, the overhead of the street railway department was supported on poles of the Detroit Edison Company or the Department of Public Works, so as to avoid the erection of a duplicate pole line. The steel poles are 30 ft. high and made up in three sections, 7 in., 6 in. and 5 in. in diameter, for tangent track and fitted with a plain cast-iron cap and a 2-ft. dog guard placed to extend 1 ft. above and 1 ft. below the ground line. The bottom section of these poles is extra heavy, the other sections being of standard thickness. For use at strain points the steel poles are made up of 8-in., 7-in. and 6-in. diameter sections. Outside of the 2-mile radius, Western red cedar class B poles of A. E. R. E. A. specifications, mostly 30 ft. high, with some 35-ft. and 40-ft. poles, are used. These poles were treated by a process including a four-hour immersion in hot creosote followed by a four-hour immersion in cold creosote.

The steel poles, which also practically conform to the A. E. R. E. A. specifications, are set in concrete 6 ft. in the ground. The wood poles are set the same distance in the ground and provided with a ring of concrete 1 ft. high at the bottom of the pole and a concrete collar at the ground line. To improve the appearance of the overhead construction where the Charlevoix Avenue line crosses East Grand Boulevard, a Massey hollow concrete pole was set on either side of the boulevard.

The No. 00 hard-drawn round trolley wire was made



AT LEFT, THE HOLE DIGGER IS ALSO EQUIPPED WITH WINCHES AND DERRICK AND IS USED TO SET THE POLES. AT RIGHT, APPEARANCE OF COMPLETED OVERHEAD ON TANGENT TRACK. POLE LINE AT THE LEFT WAS SET BY THE RAILWAY COMPANY

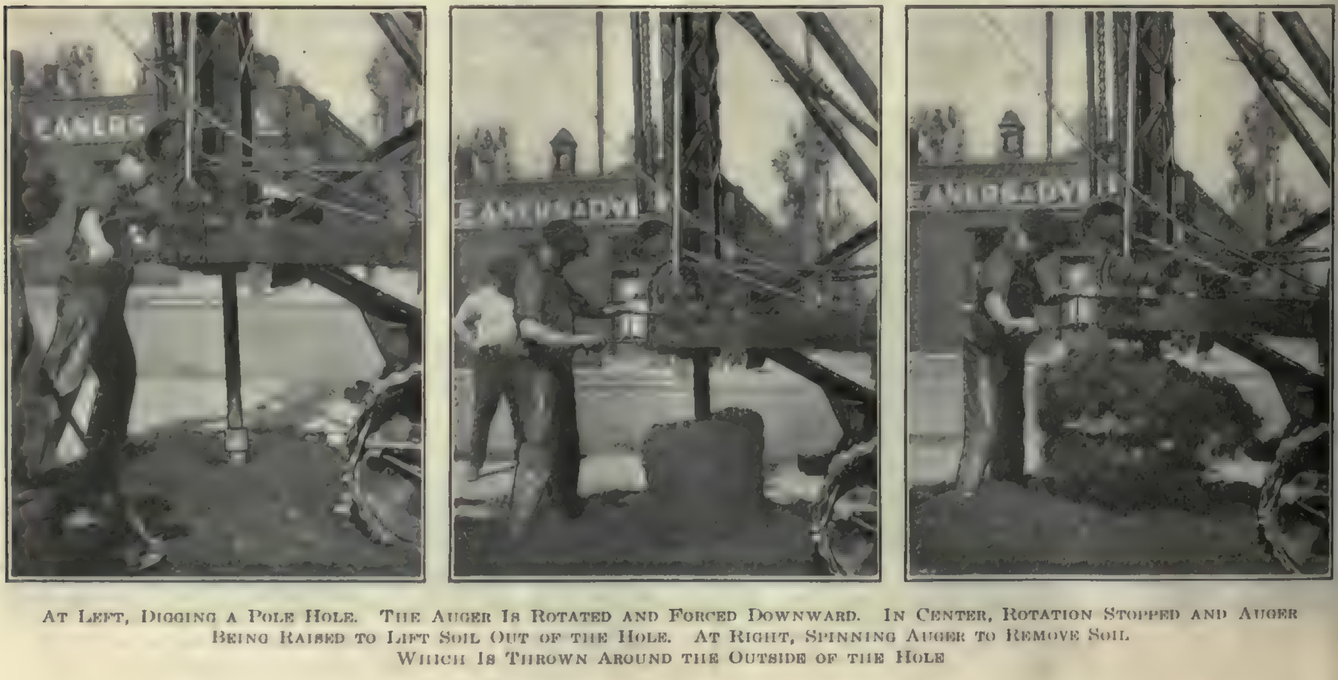
Temporary Car Shop of the Municipal System

after A. E. R. E. A. specifications by the Detroit Copper & Brass Company. This was used over tangent track and phono-electric wire over the curves. The hangers used were of the standard round top design and supplied by various manufacturers. Standard single and double curve pull-overs were employed. Porcelain strain insulators were used exclusively, for the reason that in case of breakage the loops of the span wire lock together and, while the insulation is lost, the overhead does not fall. Where the span wires are attached to wood poles double insulation is provided between the trolley and the pole by the hanger and a single strain insulator. With the steel poles, however, an extra porcelain insulator is inserted so that triple insulation is secured.

The span wire is $\frac{5}{16}$-in. seven-strand galvanized steel and the pull-off wires are ¼-in. seven-strand steel galvanized wire. All curves are erected with a backbone construction using either ⅜-in. or ½-in. seven-strand galvanized steel wire, depending on the strain at the particular location. By using this backbone construction all pull-offs are placed radially and "pockets" in the overhead work avoided. Up to the time of this writing the overhead construction had been done with the use of an ordinary stationary platform tower mounted on a motor truck. This was taken down at night in order to drive through the streets with safety. Orders have been placed, however, for one 2½-ton truck equipped with a Trenton tower and one 4-ton platform truck on which a winch will be mounted, for use in the further construction work. All of the trolley and span wire was strung under a definite tension measured by dynamometer, and all poles were set with a plumb bob and given a rake of 1 ft., measured at the top.

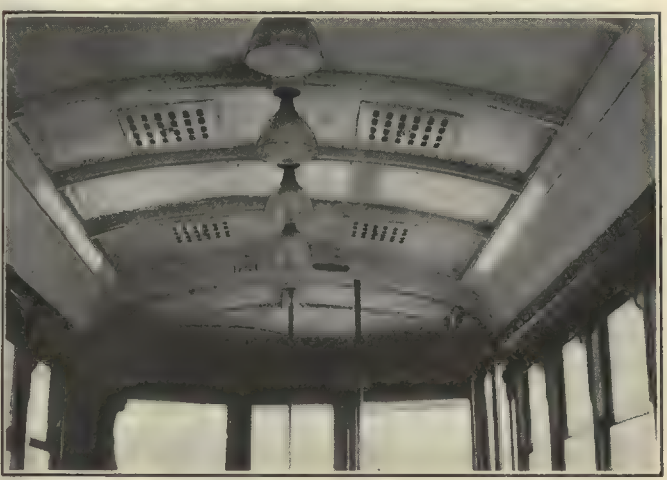
A feature of this Detroit overhead construction was the use of a new anchor strain plate designed by the General Electric Company and its location at mid-span. It is shown in an accompanying picture. One of these plates is installed on each trolley wire and the two are connected with two lateral wires having strain insulators at the middle point and terminating in a ring outside the trolley wire. These rings are then guyed by diagonal wires running to the four poles of that span. At the present time these strain anchors are installed only at the approaches to curves, but it is planned to install them on tangent track every 1,000 ft. later on. As the strain plates are installed at the middle of a span, the anchor may be installed at any time without disturbing the construction already in place.

The 500,000-circ.mil feeder cable, where it is installed, is carried on an insulator mounted on a Way insulator pin which loops over the cross-arm so that the only hole made in the cross-arm is that for the through-



At Left, Digging a Pole Hole. The Auger Is Rotated and Forced Downward. In Center, Rotation Stopped and Auger Being Raised to Lift Soil Out of the Hole. At Right, Spinning Auger to Remove Soil Which Is Thrown Around the Outside of the Hole

Type of Car Being Used on the Detroit Municipal Lines



This Shows the Roof Construction and Lighting Arrangement

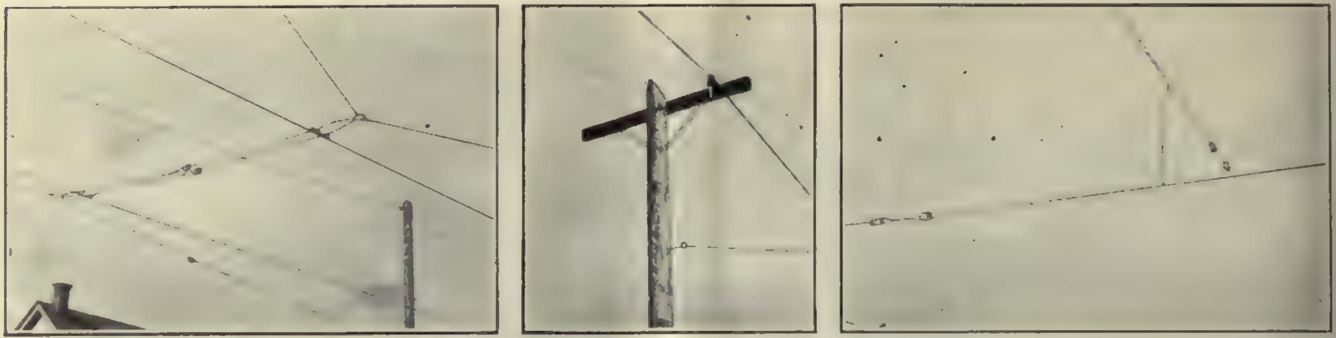
bolt fastening at the pole. A unique system of making short turns around corners with the feeder cable has been adopted. Instead of the cable being carried around the turn continuously, it is cut and stub-ended in the two directions, one piece being installed higher than the other at the corner. A piece of the cable is then installed vertically between the two and connected to them by Dossert connectors pulled up tight with a wrench and taped. Accompanying views picture this construction.

The cross-arms are Washington fir and the braces and other pole-line hardware are of standard A. E. R. E. A. design. The feeder cable is of standard triple braid weatherproof stranded copper with No. 0000 feed-in taps. No negative feeder has been installed as yet except that making connection from the nearest point of a car line with the Detroit Edison substation, from which direct-current power is purchased. As already noted, however, the trackwork is being very thoroughly bonded, with a view to the ultimate use of a completely insulated negative return system, following recommendations of the Bureau of Standards.

Perhaps the most interesting phase of the construction work in connection with the overhead is the labor-saving machine used in digging holes and setting poles. Two earth-boring machines equipped with winches and derrick, manufactured by the Winthrop Truck Company, and distributed by the Western Electric Company, are used for this purpose. The following is the procedure in using this machine, and the various steps are clearly pictured in accompanying illustrations.

The machine is mounted on caterpillar tractors and of course is self-propelling. A pole to be set is first snaked by the tractor to a position close to the hole. The operator then runs the machine into a position such that the 24-in. auger is directly over the point at which a hole is desired. It should be said in passing that this tractor will go anywhere, over curbing, over open trackwork and, like the army tanks, seemingly knows no obstructions. With the machine properly set, the auger is lowered, revolved and forced into the ground approximately 2 ft. until the auger is filled with earth. The rotation is then stopped and the auger raised above the hole and spun. This throws the dirt out centrifugally around the edge of the hole. The auger is again lowered and the hole drilled about 2 ft. farther into the ground and the operation repeated. A hole may thus be dug 8 ft. deep if desired, the depth to which the Detroit pole holes are bored being 6 ft. When the hole is dug the machine backs away slightly, picks up the pole and, with two men to guide it, lowers it into the hole.

Earth Boring Machine and Tractor Dragging Pole Into Position Adjacent to Hole



At Left, New Type of Strain Plate Mounted at Mid-Span with Guys to the Four Poles of the Span. In Center, Type of Pole, Crossarms and Hardware Employed. Feeder Cable Loop Insulator Pin Which Avoids a Hole in the Crossarm. At Right, Dead-End Method Employed in Making Short Turn of the Feeder Cable

The propulsion of the tractor and handling of the derrick are controlled from the operator's position on the machine. The rotation and raising and lowering of the auger is controlled from levers extending in front of the machine by a man who stands on the ground. On speed tests, the hole has been dug and pole set in two minutes. This ordinarily requires about four minutes. Including the time required in moving from one position to the next, a pole may be set about every ten or fifteen minutes. This, of course, does not allow for breakdowns, which always occur with any piece of machinery subjected to very heavy duty and rough handling. The machine is served by four men on the average.

At present all power used by the municipal railway is furnished by the Detroit Edison Company. What the future power supply will be depends on the working out of the study being made by the Public Lighting Commission to determine the advisability of building a large new modern steam plant of sufficient capacity to handle the street lighting and lighting of public buildings and the railroad load, to displace the present small steam plant used for street lighting and the lighting of public buildings alone. So the railway department is confronted with the problem of arranging for a temporary supply of energy for the next two years, and thereafter, for the permanent supply either with the Detroit Edison Company or the Municipal lighting plant. At present, the only power equipment owned by the city is the feeder plants in the Detroit Edison substations and positive and negative feeder cables connecting the lines, the power company having furnished everything else needed.

Another View of the Finished Track and Overhead Showing Safety Stop Signs Employed and Concrete Poles Erected Adjacent to Boulevards

Outside of the streets already occupied by the Detroit United Railway, Detroit is miserably laid out for a street car system. The streets are very narrow, the blocks short and few streets run through, thus making necessary many sharp curves, including frequent reverse curves at points where there is a jog in the street. Sufficient clearance for the passing of safety cars on the curves has been secured, but if the large Peter Witt type cars are later used, the vestibule platforms will have to be narrowed in about 7 in. to give proper clearance. Some of the short, sharp reverse curves make this matter of clearance a difficult problem. Some of the routes are necessarily rather circuitous and some encounter many grade crossings with steam roads, main line and switching yards.

These various things will tend to make operation difficult and slow and somewhat hazardous. The city is making an effort to remedy these conditions as far as is practical by engaging in a great street widening campaign, coincidently with the railway construction. Most of the streets on which car lines are being built are either only 26 ft. or 34 ft. wide. These streets are being widened to 36 ft. and 40 ft., this work usually following along after completion of the track. The widening and paving of some of the streets in which new car lines are being built will open up badly needed through, short cuts between sections of the city not now having any direct communication. These lines will thus be subjected to the conditions imposed by more or less heavy vehicular traffic, perhaps further impeding rapid street car operation, though helping materially to develop the city. So the municipal railway officials will have operating problems to keep them interested after the construction work is done.

The cars in use and purchased thus far (300 in all) are divided 250 of the standard one-man safety type and fifty of the Peter Witt type. The present cars are equipped with Woods locked fare boxes and air-operated International registers, center lighting, Nichols-Lintern indicating signals, headlights mounted on the roof and an electrical interlock making the car inoperative if both trolley poles are on the wire. Some complaint has been made that the cars were noisy, and this has been attributed by some to the rigid type of track construction. An investigation with some experiments showed that the noise could be materially lessened if some sound-deadening material was put in the roof of the car, there being no head-lining. It is expected that this trouble will be largely overcome in the cars now on order.

# Commission Popular in Keystone State

### Pennsylvania, with Its Less Rigid Commission Laws and Decisions, but with the Largest Number of Public Utilities of Any State, Is Regulating Very Effectively—Safety Work an Important Duty—Classification of Pennsylvania Utilities

STATE regulation of railroads, the usual initial step toward public utility regulation, is comparatively new in Pennsylvania, the first law controlling them having been enacted in 1907. This law created a commission of very limited powers, lacking in the main the final orders mandatory for railroads and giving but little jurisdiction in many important phases of railway regulation until strengthened by later amendments.

The law controlling railroads was in many respects copied from other railroad commission laws and resembled closely the law of Wisconsin, which had been in active use for several years. Later, necessity arising, the Legislature of Pennsylvania completed another law, regulating at this time not only railroads but all public service companies. This law in effect is as follows:

> An Act defining public service companies; and providing for their regulation by prescribing and defining their duties and liabilities; prescribing, defining and limiting their powers and regulating their incorporations and to a limited extent regulating municipal corporations engaged or about to engage in the business of public service companies; creating and establishing a Public Service Commission for the regulation of aforesaid; prescribing and defining the powers and duties of such commission and its officers. . . .

For the purpose of regulating these public service companies and of carrying out the provisions of this act, the Public Service Commission was created which consists of seven members, who are appointed by the Governor and approved by the Senate, the term of office being ten years. This long term of office is an unusual feature which provides a means of securing great continuity of administration. By the usual arrangement in the first appointments of a four-year term for the first commissioner, five for the second, six for the third and so on, until the last commissioner has a ten-year period, the term of only one commissioner expires every year. Each commissioner appointed must have the qualifications set by the law, which are: He must be a resident of the commonwealth, must be an elector therein for a year before his appointment and not less than thirty years of age. Neither shall he be connected directly or indirectly with any business, employment or vocation the duties of which are incompatible with the duties of his office, nor shall he participate in any hearing or proceeding in which he has any pecuniary interest.

AT LEFT, VERY OBJECTIONABLE GRADE CROSSING IN STATE HIGHWAY WAS ABOLISHED BY A VIADUCT CONSTRUCTED 400 FT. EASTWARD. AT RIGHT, NEW CONCRETE VIADUCT WITH TEMPORARY WOODEN TRESTLE IN BACKGROUND

The personnel of the commission consists of seven commissioners as follows: William D. B. Ainey, chairman; James S. Benn, Samuel L. Clement, Jr., S. Ray Shelby, John W. Reed, John S. Rilling, Milton J. Brecht.

The secretary of the commission, John G. Hopwood, under its direction, is the executive officer, besides having jurisdiction over the remainder of the staff, preparing and issuing its determinations, rulings and orders.

The Attorney-General of the Commonwealth is ex-officio general counsel of the commission, appointing two attorneys as counsel and assistant counsel. These are Frank M. Hunter and John Fox Weiss respectively. The duties of the counsel are to attend hearings before the commission, conduct examination of witnesses and represent the commission in the courts as well as to perform all other professional duties required of them by the commission.

The staff of the commission is subdivided into six bureaus, namely:

Engineering under Chief Engineer F. H. Snow; accounts and statistics under R. F. Busher; accidents and safety under John P. Doheney; rates and tariffs under P. F. Fickenscher; public convenience under Major E. M. Vale; and a law department under Counsellor Frank M. Hunter.

### Powers and Duties of Bureaus

*Engineering*—The chief duties of the engineering bureau are to make strict investigations and act in an advisory capacity, reporting directly to the commission on all assigned subjects. By law several valuations are required, such as original cost, reproduction value less depreciation and such other valuations as are deemed necessary by the bureau.

In connection with this work this bureau has developed a system of engineering conferences for the purpose of saving the time of the commission and expediting the work. At these engineering conferences, made up of engineers representing the interested parties before the commission and presided over by an engineer representing the commission, questions of the inventory and appraisal are discussed item by item and if possible agreed upon. If agreement is not possible, the differences are noted and called to the attention of the commision or are left open for the presentation of testimony at the hearings. The results of these conferences are presented to the commission in the form of a signed report, enumerating in detail the items concerning which agreement was reached. This procedure has been found to reduce very materially the amount of testimony offered at the formal hearings with a consequent reduction in the volume of evidence to be considered by the commission, as well as a reduction in time required for the hearings.

The question of service is incorporated under the bureau of engineering and the standards to be conformed to are set, not by law, but by precedent cases. Service complaints are thoroughly investigated and remedied according to the discretion of the bureau.

*Accounts and Statistics*—Strict classification of all public service companies with a particular system of accounts to be adopted and used by each class, according to the volume of business transacted by the company, is the chief activity of this bureau. The issuance of reports, forms, cost data and the filing of all data compiled by the commission in its official business constitutes the remainder of this bureau's work. The amount of business transacted by this department is exceptionally heavy since in the State of Pennsylvania there are more public utilities than in any other state, the total being 3,750.

*Accidents and Safety*—Under this bureau is included all regulation and inspection of safety devices for every kind of public service company as well as all reports pertaining to accidents and their causes. Grade crossing improvements must be approved by the commission as required by law, and since the road-building program of the state increases yearly the amount of grade crossing work is very large.

Under this department comes also the following: Inspection and approval of interlocking systems, signaling devices, methods of construction and inspection of power lines, especially overhead crossings.

Valuable statistics are compiled by this department concerning accidents but these are withheld from public inspection except by permission of the commission.

The bureau of accidents receives approximately 15,000 reports yearly relating to accidents of a public service character, all of which are tabulated and examined with a view toward suggesting a possible remedy for a recurrence of collisions, etc., under similar conditions. Particular attention is paid to accidents occurring at grade crossings of steam railroads. Records show that there are 11,720 public crossings in Pennsylvania, and while the commission is moving as rapidly as time and money will permit in bringing about eliminations, it will be many years before the dangerous grade crossings will have been eliminated.

The advent of the automobile introduced a factor in grade crossing accidents of considerable consequence, as may be observed from the fact that 429 automobiles were struck at these places during the year 1920, and that in one month of the present year automobiles were involved in thirty-four of the thirty-seven collisions with trains. There is no doubt of the existence of crossings surrounded with dangerous conditions, and there is no doubt that in many cases the recklessness of the traveler over the crossing is responsible for the disaster.

Under the direction of this bureau the advance warning signs adopted by the American Railway Association are being placed 300 ft. from each crossing. The railroads are providing the signs free of charge with the understanding that the municipalities erect and maintain them. The expectation is that before the end of the year these warnings may be seen on all the highways in the state.

### SOME PECULIAR ACCIDENTS OCCUR

In the course of its work the commission occasionally deals with accidents of an unusual and peculiar kind. In one instance two street railway passengers in different cars traveling in opposite directions were leaning out the windows; their heads bumped and one of the men was instantly killed. A few years ago a fishing rod carried by a minister of the Gospel came in contact with an electric wire with fatal result, and was it not the irony of fate to find a dead tramp in a railroad wreck with nothing in his pockets but four-leaf clovers?

*Public Convenience*—This department constitutes a very important factor in the commission's work, for through it pass the applications for incorporations or right to do business.

To the bureau of public convenience there have been assigned by the commission, under the public service company law, all proceedings relating to the issuance of certificates of public convenience and certificates of valuation, evidencing the commission's requisite approval under the various provisions of the act.

These proceedings consist of contracts between municipal corporations and public service companies; incorporation of utility companies; reorganization and amendment of charters of such companies; sale, assignment, transfer, or lease of the property of the public service corporations; consolidation and merger of public utility companies; acquisition or construction by a municipality of a public service plant; acquisition of the right, title, or interest in the stock and bonds of other public service corporations; construction, alteration, and relocation of any crossing at grade, above grade, or below grade at a point where the tracks of a railroad or street railway cross any public highway; valuation of the property and assets of public utility corporations; right of foreign public service companies to do business in the State of Pennsylvania.

### PASSES ON CONTRACTS AND FRANCHISES

The character and scope of such proceedings directly under the supervision of the bureau may be better illustrated by the following statement of the cases submitted during the year 1920:

134 Service contracts. (Entered into between utility companies and municipalities.)
95 Franchise contracts.
132 Incorporations.
10 Mergers and consolidations.
137 Leases and sales.
116 Railroad and railway crossings.
681 Motor transportation, or taxi transportation, lines.

The policy of the commission, as sustained by the Appellate Courts of the State, has been not to approve a franchise contract which fixes the rate to be charged by a utility company, it being held that, under the public service company law, the commission has exclusive jurisdiction to fix rates which a utility shall charge; and that, under the police power, the state has the right to delegate to the commission such power.

On auto transportation lines, the commission has adopted the policy of not approving applications of that nature where existing and operating common carriers are furnishing service which adequately and conveniently accommodates the public.

In crossing proceedings, the commission follows the well-established principle, as laid down by the courts of the state, namely, that no grade crossing over a public highway by the tracks of a railroad or street railway will be approved, unless the testimony clearly establishes an imperious necessity and the fact that no construction than that at grade is possible. A large number of the crossing proceedings filed during the past year were for the abolition of dangerous grade crossings, or the construction of industrial sidings across public highways to serve manufacturing plants. In every case where the commission approves a grade crossing, such approval is made subject to conditions which, in the opinion of the commission, protect and safeguard the public.

MEMBERS OF THE PENNSYLVANIA PUBLIC SERVICE COMMISSION
Top row, left to right, Samuel M. Clement, Jr.; William D. B. Ainey, chairman; S. Ray Shelby. Bottom row, left to right, James S. Benn, John W. Reed, John S. Rilling, Milton J. Brecht.

Classification of the utilities show there are twenty-seven different classes, including transportation utilities such as airplane companies, which makes an admirable provision for the future. The present commission allows this department no jurisdiction over municipal utilities but only gives it power over those privately owned, a feature differing radically from most state commissions. Jitney regulation was established in this state among the first.

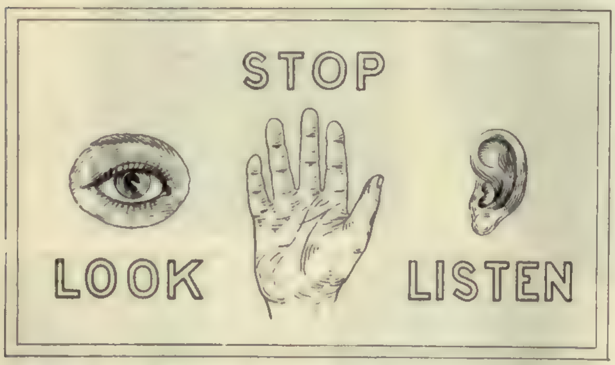
Meter testing and calibration for both utilities and their consumers are problems which have been undertaken to widely varying extent by the different state commissions. In many instances these tests are required of the utilities themselves. In Pennsylvania a very complete laboratory has been equipped for this purpose under the direction of H. B. Pratt. A building near the Capitol in Harrisburg has been adapted for this purpose, in which two floors are devoted to a very complete installation of electrical generating and testing equipment. Several independent forms of electrical energy are provided from remote-controlled motor generators located in the basement of the laboratory. Elaborately appointed testing benches provide facilities for rapid connection and calibration of all types of measuring instruments and meter transformers. All calibrations are referred back to the standard cell and potentiometer, while current transformers are tested by the Brooks method, using two wattmeters. Portable Edison storage batteries of large capacity are used for direct-current calibration. Another battery of larger capacity forms part of the equipment and floats upon the direct-current supply busbars.

The law in Pennsylvania provides for tests of utilities standards only. This plan is, of course, open to some objection, since the consumer has no unbiased source of testing. However, the standards of the utilities are kept in accurate calibration by periodic tests and adjustments in the laboratory of the commission, and such companies are encouraged to install laboratories and follow up consistently the testing of consumers' meters. In Philadelphia and Pittsburgh, where the laboratories are more complete, the standards are calibrated under the supervision of a representative of the commission without making use of the Harrisburg equipment.

Elaborate card catalog records of all meters tested are maintained in the laboratories of the commission at Harrisburg.

### RATES AND TARIFFS

The scope of this department is very large, embracing the entire fields of rates, complaints against rates, and reparations or excess fare awards. The number of tariffs handled in this department totals 2,000 per month. This totals over 170,000 since 1914, divided as follows: Railroad tariffs, 140,000; street railroad tariffs, 2,391; other utilities, 30,000. In spite of the preponderance of railroad tariffs the amount of work on non-railroad tariffs is the largest due to details of appraisals and accounting in railway, power and light utilities.



SUFFICIENTLY UNIQUE TO ATTRACT ATTENTION. WILL IT PREVENT ACCIDENTS?

In the field of street railway operation all cities in Pennsylvania charge more than 5 cents for fares, the only exception being in small towns where the people would walk otherwise.

The commission cannot suspend rates but in place of that action excess fare tickets or reparation awards are substituted. This department also has direct control over sales and mergers of utilities but, illustrating a unique feature of the commission, it has no power to control stock and bond issues.

The approval of the commission is not necessary to change rates, providing the previous rate was not ordered by the commission, and an ample notice of thirty days' time is given so as to allow for complaints in case of a new rate.

CLASSIFICATION OF UTILITIES IN PENNSYLVANIA

| | |
|---|---|
| Repair shops | 16 |
| Auto transit companies | 38 |
| Canal and navigation companies | 3 |
| Electric light, heat and power companies | 227 |
| Ferry companies | 25 |
| Artificial gas companies | 76 |
| Natural gas companies | 115 |
| Gas and electric companies | 12 |
| Inclined plane companies | 5 |
| Pipe-line companies | 12 |
| Municipal sewage treating works | 14 |
| Steam heating companies | 18 |
| Steam railroads | 130 |
| Electric railway companies | 114 |
| Telephone companies | 196 |
| Toll bridge companies | 196 |
| Turnpike companies | 72 |
| Water companies | 711 |
| Miscellaneous | 5 |
| Total | 1,820 |

### CONCLUSION

Conference with Hon. W. D. B. Ainey, chairman of the commission, and one of the leading railway commissioners of the country, emphasized the significance of the Wilkinsburg Electric Railway case as a precedent for future decisions involving local municipal franchises. No railway may, of course, enter the streets of a city without consent of the municipal authorities. Consent may be granted or withheld for no good reason and the rate of fare is often seriously involved in such a grant. The case in question, supported as it was by Superior and Supreme Court decisions, offers an adequate remedy for such a condition.

Furthermore, the statute to the effect that corporations may not issue stocks or bonds except for cash is carefully enforced by the commission.

Commission regulation in Pennsylvania, though not as completely developed as in other states as far as rigid control is concerned, certainly has been a great success as evidenced by the enthusiasm of the companies affected. It appears to have not so many bitter enemies as are found in some other states, which can be probably attributed to the just and fair administration of the state's laws.

# Merchandising Transportation

**A Talk on the Principles of Advertising for the Promotion of Traffic—The Principles Sought in Drafting Advertisements Are Given and Typical Advertisements Are Reproduced**

BY W. H. BOYCE
General Manager Beaver Valley Traction Company, New Brighton, Pa.

THE real object of advertising is to sell. It may be to sell an article, an idea or a service. If an advertisement designed to sell street car rides does not sell street car rides, no matter what other virtue it may have, it is a failure as a transportation sales force.

Advertising is the thing that should make our trade increase. Printed matter is not the only kind of advertising. Every act of each employee is an advertisement. Reputation, honesty, politeness, methods, neatness, promptness, and thoroughness are advertisements. The quality, price, frequency, your aggressiveness, everything is an advertisement—either good or bad.

The most convincing—not the loudest—advertisement wins.

One of the best advertisements for street railways is to be found in the good impression carried away by the car riders and reported to their friends and their neighbors.

Advertising directly to increase the sale of transportation has been conducted as far back as 1917 by the company with which the writer is connected. At that time the Beaver Valley Traction Company ran advertisements of the nature of those shown on the opposite page.

Since that time, advertisements along the same line, samples of which are also presented on the opposite page, have been effectively used from time to time by the company.

### We Are Selling Street Car Rides

When we advertise our business we do so to simplify the selling of our product—street car rides. This is obvious, but the way in which we advertise and how this advertising benefits our customers is decidedly important, as it is an integral part of our "rapid transit merchandising" policy, carefully planned and effectually carried out. With us it is not a case of too many brands of the same article or too many "slow sellers." No, indeed! On the other hand, we concentrate on the highest grade of rapid transit service, including the "last word" brand of street cars and a most generous ride for which we charge you only a

**5-Cent Piece**

### Service

*Do You Know:*

That service is the only thing we have to sell?

That while increased cost of labor, fuel and material has added greatly to operating expenses the last year,

**You May Ride as Far for 5 Cents Today as You Did Before We Were Obliged to Meet This Additional Expense?**

### We Will Carry You Farther for a Nickel Than Any Other Method

Ever think of it before? No other method of transportation will carry you as far for so little money as street railway lines. Think of the distance from Morado to Junction Park, for instance, 6 miles for 5 cents.

It's cheaper than railroads, automobiles, horse and buggy or even shoe leather.

Yet we carry daily hundreds this distance, who never stop to consider this fact.

**Think It Over**

### What Is Street Car Service?

Street car service is not altogether a matter of rules and regulations—not only a matter of cars operating through your streets.

Street car service is a human understanding of your needs, and the ability to meet those needs to your complete satisfaction.

We want to know more of your needs and attend to them for you.

Won't you write and tell us what you want or need?

TYPICAL DISPLAY ADVERTISING ANNOUNCEMENT BY BEAVER VALLEY TRACTION COMPANY

Personally, we never have been and are not now inclined to the belief that billboard advertising for the merchandising of transportation would be as productive as newspaper advertising, car cards, company publications, and circular letters.

Railway advertising must be of the positive and not of the negative kind. If we are honest with our employees and the public, we do not have to waste a lot of time trying to recall a lot of our former statements; hence, we can devote all our thoughts and energy, when dealing with the public, to the selling of our goods.

Statements to our employees and to the public should be easily understood. We must make good on every promise, stated or implied. Only in this way can we gain the confidence of the people with whom we are dealing, and without confidence we cannot be successful.

Don't forget that the human element is the one great thing sought for, or aimed at, in selling campaigns.

True economy uses opportunity. It does no one any good to save a little money if by so doing he sacrifices a more valuable opportunity. Each of our street cars in operation offers you an opportunity to economize time and money. We suggest that you improve the opportunity.

"Shop" for the dealer as well as the article. If you could get a 5 per cent reduction in the price of an article by going a block farther down the street, you would be inclined to go to that much trouble. Do you know that the actual intrinsic value of the service that the Beaver Valley merchant is able to render, by reason of his proximity, is often worth more than the 5 per cent? Try our local merchants. They will make good on price, quality and service.

What is "street car service"? Street car service is not altogether a matter of rules and regulations—not only a matter of cars operating through your streets. Street car service is a human understanding of your needs, and the ability to meet those needs to your complete satisfaction. We want to know more of your needs and attend to them for you. Won't you write us a letter and tell us what you want or need?

Value received. When you pay your street car fare the ride you secure is the only physical expression of the service you receive from us. The real value lies in our ability to furnish the kind of transportation you expect. There is no price on this. You get it or you do not. We want to give you a perfect or supremely excellent service. That's our ideal. If for any reason you do not get the kind of service you want and expect, won't you be kind enough to drop us a note giving the facts in the case? To be successful we must furnish the kind of service that *you* want.

Don't walk! Ride! The tired worker will enjoy his evening meal more if he rides home on the street car. Rest of body, mind, and complete relaxation comes when you ride. Walking, mind and body must be continually alert to the dangers of the street lest death or injury claim you as a victim. The saving of 5 cents won't pay many surgeons' fees or much of a doctor bill. Ride! Don't walk! Be safe!

Could the public learn by some comparison? Double the number of patrons going into any two of the largest but best-known stores in Beaver Valley in a week's time; count all the patrons of all the theaters in the country on any big Saturday; take and double the crowd at the biggest of the county fair days, and the street car conductors still have a greater number of customers daily.

In view of that do you still think that just anyone can be a conductor—a salesman of rides on these lines? The clerk who makes fifty sales a day may be good—a street car salesman sells ten to twenty times that number daily. Is there any comparison? Some stores have people to "wait on you." Good stores generally have salesmen to sell and serve you.

Our conductors are salesmen in the true meaning of the word if they meet our expectation. And, although we deal in a necessity, yet we go to greater extremes in training, checking up, ironing out, and putting on the proper finishing touch than any concern dealing exclusively in luxuries.

Just "anybody" cannot be a conductor on these lines. Our rigid tests of intelligence, education, experience, and thorough investigation cannot be withstood by any but number one Class A men. After all that, we require a medical examination of each man that insures to you and his fellow employees his freedom from any skin, constitutional, chronic or malignant disease communicable to others.

It is not fair to the service we wish to give that you should commit any untoward act that would tend to break the spirit or lessen the desire of the new employee to become a proficient conductor on these lines. Our older men are experience trained in dealing with you and it is right that you should expect and receive a complete service from them.

Ride—and get there first.

Good logic for the salesman out to see a customer.

Good logic for a housewife out with the market basket.

Good logic for the shopper on the way to the business district.

Good logic for the tired worker on the way home.

Good logic for the suburban dweller.

A ride on the street car assures safety in travel.

A ride on the street car assures a missing of the congested traffic of pedestrians.

A ride on the street car is a bracer and a rest-up as well.

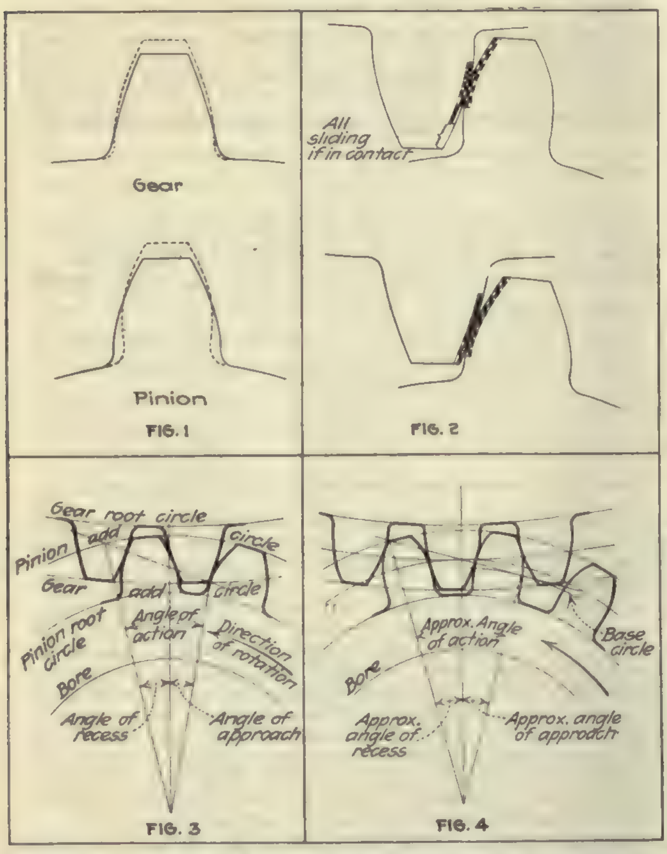
Don't walk when a ride on the street cars will save you time and energy and keep you safe.

TEXT OF OTHER ADVERTISING ANNOUNCEMENTS BY THE BEAVER VALLEY TRACTION COMPANY

# Tooth Contour of the Helical Gear

**The Various Design Features of This Type of Gear Are Explained and the Reasons for Its Superiority Over the Spur Gear Are Shown**

AT FIRST it is probably not evident just why the helical gear has characteristics superior to those of the spur type. As Messrs. Phillips and Holy pointed out in their paper printed in the July 2 issue of the ELECTRIC RAILWAY JOURNAL there are several undesirable features inherent in the spur gear, although many opportunities for improvement which existed could not be utilized because the multiplicity of standards thereby introduced would nullify the benefits to be derived from these mechanical perfections. Therefore, the introduction of the helical gear for railway use automatically clears the way for manufacturers to market a gear embodying the latest development in two forms, since any interchanging of the two types is impossible. At the same time the helical gear corrects the "stepping over" action of the older type and the result is a quieter running gear that can transmit a heavier torque for a given width of face.



MESHING ACTION OF INVOLUTE AND HELICAL GEARING

Fig. 1—Sections of gear and pinion teeth of both helical and spur gears. (Full line is the helical.)

Fig. 2—Illustrating the relative amounts of rolling and sliding action. (Above, spur; below, helical.)

Fig. 3—The angle of recess is greater than the angle of approach with the helical gear.

Fig. 4—With the spur gear the two angles are approximately equal.

The accompanying drawings show how the tooth contour and the meshing action of the two types vary. It can be seen from the full outline in Fig. 1 that the tooth of the helical gear is substantially stronger at the base than the old 14½-deg. tooth. The strength of this new tooth is approximately 200 to 250 per cent of that of the spur-gear tooth. This is true not only because there is more metal at the base, but also because the tooth is shorter and consequently the moment of the forces acting on it is less.

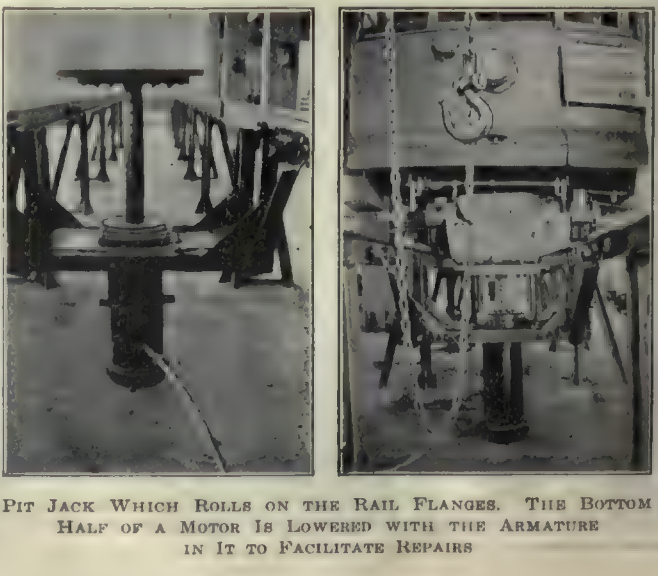
From Fig. 2, the amount of rolling that is obtainable on the new tooth form is illustrated. Small black and white squares indicate the length of tooth contour that mate together. For instance, a length of contour on the gear face equal to the first square starting at gear tip rolls and slides with a length equal to that of the last square on the pinion flank, etc. This shows relative lengths of involute contour for mating gears.

Over the entire face the rolling action of the new tooth form varies from 55 per cent to 70 per cent pure rolling as against approximately 40 per cent for the 14½-deg. spur tooth. This is an increase of about 50 per cent in rolling contact. The cause of this is partly due to the 14½-deg. tooth contour being necessarily corrected for interference, undercutting and methods of manufacturing, whereas the new tooth contour is involute throughout, partly due to increase in pressure angle. From this feature alone there is a decided improvement in uniformity of velocity ratio and smoothness of operation when first installed. As the bearing wears, these advantages over the 14½-deg. contour become even more pronounced.

In Fig. 4 showing the angle of action of the ordinary spur gear it will be noticed that the angles of recess and approach are approximately equal. In helical gearing a better design has been obtained by the use of a long and short addendum, *i.e.*, a long addendum on the pinion and a short addendum on the gear. The benefit derived from this is well understood to the trade and is due to the increase in angle of recess and decrease in angle of approach. The effect of this is to reduce friction and aid in smoothness of operation as the friction of the arc of approach is greater than that of recess. The design as shown in Fig. 3 is such as to secure an angle of approach approximately 70 per cent of that of recess. It will be noted that stubbing the tooth somewhat slightly reduces the total angle of action for the new tooth form, but this is more than counteracted by the added angle of action due to the helix angle.

# Convenient Type of Pit Jack

ACCOMPANYING illustrations show a homemade pit jack which was constructed in the shops of the Northern Texas Traction Company and which is giving very satisfactory service. The pits in this shop



PIT JACK WHICH ROLLS ON THE RAIL FLANGES. THE BOTTOM HALF OF A MOTOR IS LOWERED WITH THE ARMATURE IN IT TO FACILITATE REPAIRS are of the open type and the pit jack is arranged so that it rolls along on the inside of the rail. The frame is constructed of 3-in. channels with $\frac{3}{16}$-in. corner gusset plates. The rolling elements are made of No. 408 ball bearings that have pitted balls, which make them unfit for other service. The cylinder has a side adjustment of 12 in. and the plunger or push rod has holes drilled 1 in. apart. This allows a ½-in. pin to be inserted at any desired height as a safety feature. The top has a minimum height of 3 ft. 2 in. and a maximum lift of 5 ft. 7 in.

# Portable Substation with Collapsible Construction

### A Standard Flat Car Provided with a Superstructure Which Can Be Readily Removed Enables Heavy Parts to Be Handled by Cranes

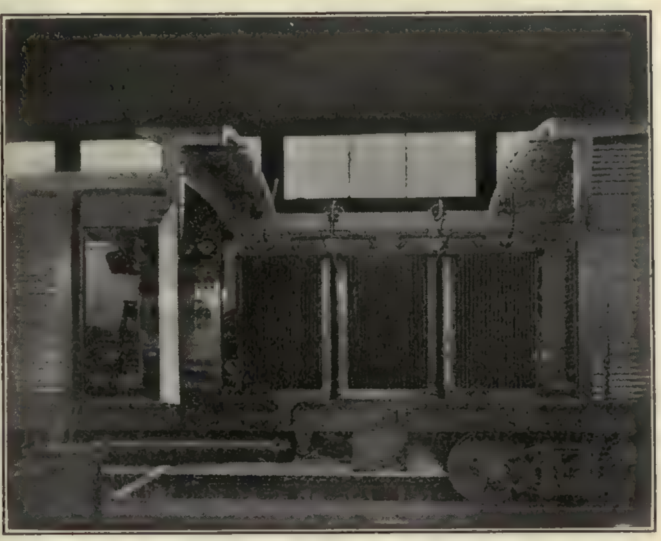
BY F. J. FOOTE

Superintendent of Power Ohio Electric Railway

THE accompanying illustrations show a 500-kw. portable substation which has recently been constructed by the engineering department of the Ohio Electric Railway and which has now been placed in service near Springfield, Ohio. The chief feature of the construction lies in the fact that portions of the roof and sides of the car can be readily removed, thus enabling the heavy parts of the equipment to be reached by crane or derrick. This makes rapid repairs possible and also reduces the cost of such repairs when compared with what would be necessary for a portable substation of the usual type.

One of the company's regular steel underframe flat cars was used and the superstructure built on this, the side posts being placed in the stake pockets along the sides of the car. The type of construction used and the location of the apparatus can be readily seen in the accompanying illustrations.

The construction of the high-tension and direct-current choke coils has some rather unusual features. The high-tension choke coils are made of No. 2 solid bare copper wire and consist of twenty-five turns 15 in. in diameter on a ¾-in. spacing. Each coil is held in shape by three wood clamps running the full length of the coil. The direct-current choke coil is an extra large one, 30 in. in diameter, and consists of ten turns of 400,000 circ.mil covered cable. This is also held in shape by wooden clamps. This direct-current choke coil is placed on the roof of the car and all parts were made in the company's shops.

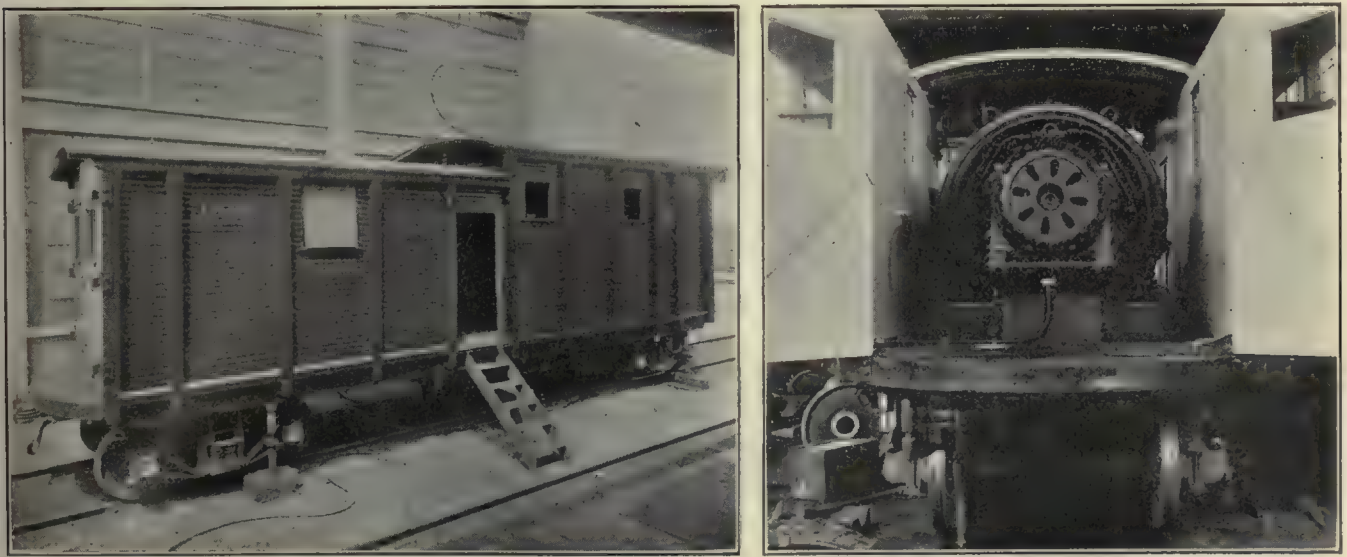


TRANSFORMER SECTION WITH PORTIONS OF SIDE AND ROOF REMOVED

The equipment of this portable substation consists of a 500-kw., six-phase rotary, three 200-kva., 26,000-volt to 390-volt, oil-insulated, self-cooled transformers, a two-panel switchboard, gap-type lightning arresters and choke coils.

## Type of Interurban Car for Germany

IN DESCRIBING some design and structural features of a type of interurban car recently purchased by a railway in Germany, *Engineering Progress* says that despite materially greater strength, it has been found that iron bodies which are designed as a beam of large cross-section are lighter than wooden ones. The fault of the cars built of wood was that none but the longitudinal beams were used to support the body. The cars with bodies having a wooden framework weighed from 19,000 to 20,900 lb., while the steel bodies weighed no more than 17,300 lb. This meant a saving in weight of from 1,700 to 3,600 lb. The steel car has given excellent satisfaction.



AT LEFT, PORTABLE SUBSTATION IN SERVICE ON SIDING; AT RIGHT, GENERATOR END OF THE SUBSTATION

# Successful Use of Welded Joints in Baltimore

### Notable Immunity from Broken Joints Has Been Experienced in Baltimore, Where the Welding Is Not Carried Across the Entire Width of the Joint Plate

By W. W. Wysor
Chief Engineer United Railways & Electric Company of Baltimore

OF PARAMOUNT importance and interest since the beginning of railroads has been the question of joints. The joint not only determines the life of the rail but, in street railways, is responsible for a very large proportion of the maintenance charges on track and paving, as well as being a factor in accidents and the up-keep of rolling stock.

A great deal of time and study has been devoted by engineers to some method of "eliminating" the joints, especially in paved streets, and to this end many forms of splice bars have been developed and placed upon the market. While the modern form of splice bar is a decided improvement over the old fish plates, it has been found that no form of bolted or even riveted joint would have a life equal to the unbroken rail, and in their efforts to reach this goal engineers have turned their attention to welding.

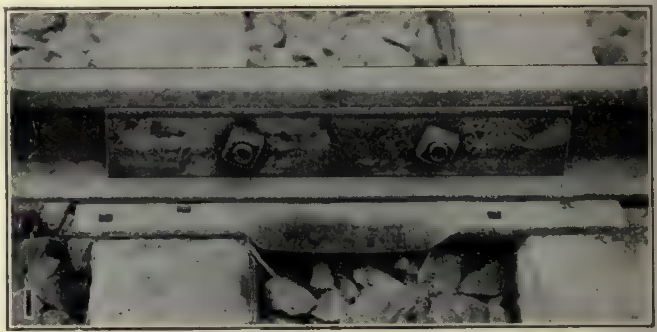
The welding of joints, in some form or other, has been practiced for many years with more or less success, depending largely upon the thoroughness with which the details of the particular process have been worked out and the skill of the men doing the work. Among the better known types of welded joints are the cast, Lorain and thermit weld. All of these have been used with much success and are being extensively employed today. Much interest has been manifested in recent years in seam-welded joints, and it is this particular type of joint with which this article deals.

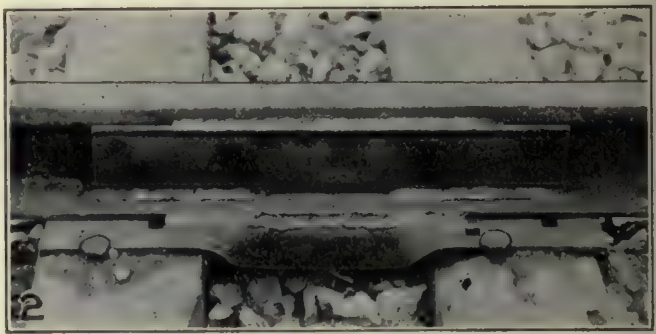
A seam-welded joint is one in which the rails are joined by standard or special splice bars and the edges welded to the head and base of the rail. The welding may be done by means of an electric arc or by gas flame, but the electric arc is most generally used.

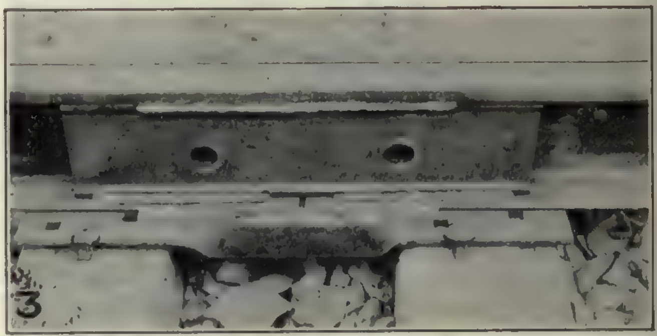
While alternating current has been used to some extent in arc welding, so far as I am aware, direct current has been used exclusively on rail-joint welding of this kind. It may be drawn from the trolley wire direct by inserting in the circuit suitable resistance, or a motor-generator set may be used. In either case the joint, consisting of splice bars and rail, becomes one of the electrodes, the other electrode being the terminal of the lead from the trolley wire or from the motor-generator set. In case current is used direct from the trolley wire, with merely resistance in the circuit, the joint is of course negative, but where a motor generator set is used it is the usual practice to reverse the polarity and make the joint positive. The negative or portable electrode may be either a carbon pencil or a metallic rod. Where a metallic arc is used, the extra metal for welding the seam is contained in the electrode itself, but where a carbon arc is used the extra metal necessary is supplied in the form of a rod or wire cut to the length of the weld to be made and is laid along the seam to be welded and fused with the joint plate and rail.

In Baltimore we use a motor-generator set and the carbon arc process. On girder rail work we use standard splice bars 24 in. long and a special base plate, this base plate being 28 in. long by 10½ in. wide spanning over two ties. On T-rail work we use a splice bar especially designed for welding, and we also use the same base plate as for girder rail.

Up to the present time we have welded 7-in. girder rail, L. S. Co. Sec. 105-484, and standard 100-lb. T-rail A. R. A. type A only. In both cases we purchased the rail drilled with one hole only, 5 in. from the end of the rail. The splice bars were punched with two holes only, 10 in. center to center. The rails are laid and the joints are applied and secured in place temporarily by two 1-in. bolts. This is sufficient to hold the rails together and keep traffic going until welding can be done. The track is first brought to proper surface and







SEAM-WELDING RAIL JOINTS

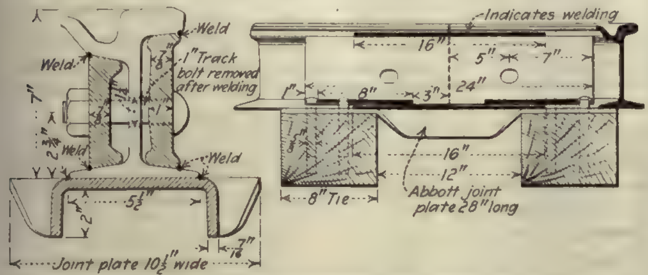
No. 1—Standard A.R.A. 100-lb. T-rail with joint plates in place ready for welding.

No. 2—Standard A.R.A. 100-lb. T-rail with joint welded and bolts removed.

No. 3—7-in. grooved girder rail with completed seam-welded joint.

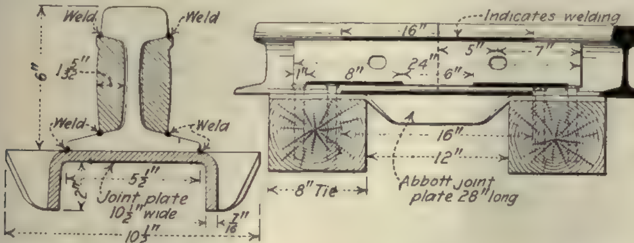
alignment before the welding is started. When we are ready to weld, the rails that are not already tightly abutted are driven back as closely together as possible. The bolts in the joint plates are then tightened up with a long wrench, the plates being driven into place by slight blows of a sledgehammer as the bolts are tightened. After the welding is done the bolts are removed and used on other joints.

When we first started this welding, about two years ago, we did not employ base plates, but the joint plates were welded for the entire length, both top and bottom. We had a few of these joints break, or rather the rail broke at the end of the joint, just outside the welding. We then started using base plates, which, as stated above, are longer than the joint plate, and we also began "staggering" the welds. Instead of welding all seams full length, we weld the top seam for a distance of 16 in., leaving 4 in. unwelded on each end. The bottom seam of the joint plate is welded in two places, each 8 in. long, the weld starting 1 in. from the end of the plates, and a gap of 6 in. is left in the center. The base plate is welded for a length of 16 in. through the center. Since this method was adopted, about eighteen months ago, we have not been able to discover any broken rails or welds.


Weld
Weld
1" Track bolt removed after welding
Weld
Weld
$5\frac{1}{2}$"
$\frac{7}{16}$"
Joint plate $10\frac{1}{2}$" wide
Indicates welding
16"
5"
7"
1"
8"
3"
24"
16"
12"
8" Tie
Abbott joint plate 28" long

SIDE ELEVATION AND SECTION OF L.484 105-LB. RAIL WITH SEAM-WELDED JOINT

The reason for making the so-called "staggered" or lapped seam welds is twofold. Wherever the weld terminates, there is more or less of a "nick" in the rail and also a metallurgical change in the rail itself, although just what this change is I am not prepared to say, and where these "nicks" or changes are opposite each other the tendency is for the rail to break at that point. The action is analagous to the breaking of a rail by "nicking" it, head and base, with a cold chisel. The "staggering" of the welds tends to overcome this trouble. Again, the flexibility of the rail is suddenly interrupted by the extreme rigidity of the box-like joint. The "staggering" of the welds tends, to some extent, to break up this rigidity.



SIDE ELEVATION AND SECTION OF A.R.A. 100-LB. RAIL WITH SEAM-WELDED JOINT

We have welded by this process about 4,000 joints and, outside of about fifteen breaks, which occurred in the early stages of our work, we have had no failures that we have been able to discover. There may, of course, be failures or partial failures that are hidden by the paving, but if so they have not become serious enough to show on the surface. We have had conductivity tests made of the joints and they show an average conductivity of 100 to 150 per cent as compared with the rail.

In welds of this kind, or any other kind for that matter, too much importance cannot be placed on the skill of operators. We have a foreman in charge of this work who is himself a skilled welder and he trains all of the other men. We do not employ for this work men who do not show an interest in welding, and we try to impress upon them from the start just what they are trying to accomplish; that is, the welding of the splice bars to the rail and not merely the playing of the arc on the welding rod until it is melted.

The construction of joints, both T-rail and girder rail are clearly indicated by the accompanying drawings and photographs.

# Letter to the Editors

## Wages Commensurate with Work Done

THE BEAVER VALLEY TRACTION COMPANY
NEW BRIGHTON, PA., July 21, 1921.

To the Editors:

I heartily agree with your editorial "Get Work Commensurate with Wages Paid" in the July 16 issue of the JOURNAL.

Acting upon this theory, we had a section put into the agreement with our trainmen last year (and it is also in our present agreement) which reads as follows:

> Where experienced trainmen of this company with one or more years of experience are rehired they shall be paid at the rate to which their previous experience would entitle them. When trainmen with one or more years' experience on foreign roads are employed they shall receive the rate of pay to which their previous experience would entitle them after their service record has been received and O. K.'d by this company.

This has been the means of our securing experienced men who had formerly been in our service or in the service of other companies and who during the period of scarcity of labor were not willing to start at the low scale of wages. The results have been quite satisfactory.

W. H. BOYCE,
General Manager.

## Havana Railway Has Its Troubles

THE needs of the transportation department of the Havana Electric Railway required during the past year that every effort be exerted to keep the greatest possible number of cars in operation and also add to that number as many new cars as could be constructed and equipped. Throughout the year 1920 this was made extremely difficult by the delay and irregularity in the receipt of imported materials of all kinds. Especially was this true during the first nine months when the stock of some important article was always giving out. While shipments were being held up by embargoes or were aboard ships lying in Havana Harbor awaiting an opportunity to unload, it was often necessary to withhold cars from service for lack of wheels or motors or other important parts that could not be provided. In spite of these difficulties thirty-two new cars were completed and delivered to the transportation department, the work on eighteen more was so far advanced that they were expected to be ready for use in January, and nine cars were entirely reconstructed.

# Status of Powdered Fuel

**Summary of Existing Installations—Detail of Burners and Pulverizers—Test Results from Various Localities—Comparisons with Stoker Plants—Trend in Combustion Methods and Firing Equipment Design**

H. D. SAVAGE of the Combustion Engineering Corporation presented a paper entitled "The Use of Powdered Fuel Under Steam Boilers" before the American Iron & Steel Institute at New York on May 27. In this paper Mr. Savage summarized the situation in regard to the use of powdered fuel under boilers in a very able manner.

In regard to the preparation of the pulverized fuel, two mills have become practically standard, respectively called the Raymond and the Fuller. Each of these mills is built in sizes of from 2 to 6 tons per hour rated capacity when grinding to a fineness so that 95 per cent of the coal will pass 100 mesh and 82 per cent through 200 mesh, using bituminous coal of less than 1 per cent moisture. The power consumption is from 15 to 20 hp. per ton per hour of bituminous coal ground to these specifications with a maintenance cost of approximately 5 cents per ton. The grinding of anthracite fuel is much more difficult and entails a higher maintenance cost, but prospects are bright in regard to the use of the Hardinge mill for this purpose.

A new mill is being developed at the present time which uses air separation, but differs otherwise in type and principle from any of the present standard methods. The prospects are good that this mill will be able to grind bituminous coal containing about 3 per cent moisture with only about half the power consumption of the present type mill.

The driers have been standardized into two types, called the single shell drier and the double shell. The latter has greater capacity, better efficiency and greater freedom from internal fires, and the first cost is not greatly different for the two types.

The conveying equipment has become standardized into two types, the screw conveyor and the air transport system. Of these systems the Fuller-Kinyon pump is probably the simplest. It is essentially a high-pressure feeder, consisting of a hopper, high-speed screw and a delivery nozzle. Air is brought into the coal at about 40-lb. pressure and forced through pipes of varying sizes, depending on the capacity for which the pump is designed.

### EXISTING INSTALLATIONS

The first commercial installation of any importance was at the Oneida Street plant of the Milwaukee Electric Railway & Light Company, where in 1918 five Edge Moor boilers, each of 468 nominal horsepower capacity, were equipped and have been in successful operation for three years without any operating difficulties. The plant operates on either Illinois and Indiana screenings or Youghiogheny coal. Tests show a combined efficiency as high as 85 per cent on the plants of this company. Another important installation is the plant of the Allegheny Steel Company at Brackenridge, Pa., where nine 333-hp. Wickes boilers and two 600-hp. Stirling boilers have been equipped. The plant has been in operation for about two years and a half and additional boilers are now being installed. A unique feature of this plant is that the coal is used as it comes from the mine without any driers and the pulverizing plant is about 350 ft. from the boiler room, to which a screw conveyor is used to transport the coal.

At the Lima Locomotive Works, Lima, Ohio, there are equipped six 400-hp. Wickes boilers, one 500-hp. Wickes boiler and one 500-hp. Heine boiler. Bituminous coal from the Central Ohio district is used in this plant, analyzing approximately as follows: Moisture, 3 per cent; volatile, 32.2 per cent; fixed carbon, 50.6 per cent; ash, 17.2 per cent; sulphur, 1.94 per cent; B.t.u., 11,935.

### DESIGNED FOR THREE FUELS

There are five 500-hp. Edge Moor boilers and two 300-hp. Edge Moor boilers equipped with the pulverized fuel equipment in Oklahoma City, Okla., at the packing plant of Morris & Company. This plant is arranged to operate on either natural gas, fuel oil or powdered coal, whichever the condition of the market warrants as being most economical. A change from one fuel to another can be made in about five minutes. At this plant the fuel used is from the McAlester district, analyzing as follows: Moisture, 5.2 per cent; volatile, 33.39 per cent; fixed carbon, 48.34 per cent; ash, 13.07 per cent; sulphur, 0.63 per cent; B.t.u., 12,417. The results of the operation have been good and observed periods have shown efficiencies of from 78 to 84 per cent. A recent report from this plant covering the first nine months of 1920, using $4.13 coal and including a 20 per cent charge for interest and depreciation, shows a net cost per 1,000 lb. of steam of $0.385. Other installations of more recent date are those at the St. Joseph Lead Company, Rivermines, Mo., where two Stirling boilers of 768 hp. were installed and have been in operation for about three months. They are being operated at from 200 to 225 per cent of rating with flue gas temperatures from 580 to 609 deg. F. Another installation is one of eight 1,308-hp. Edge Moor boilers at the new Lakeside plant of the Milwaukee Electric Railway & Light Company. Two of these boilers are equipped with the Fuller system and six with the Lopulco system. All these are now operating.

One of the most interesting installations is that now nearing completion at the River Rouge plant of the Ford Motor Company, where powdered coal is being installed in connection with four Ladd boilers of 2,640 nominal hp. each. These boilers are the largest that have as yet been built and are intended to operate at from 200 to 250 per cent rated capacity. They will operate on a combination of blast furnace gas and powdered coal, and the design is such that these fuels can be used either separately or in combination. The gas is introduced horizontally at a lower level than the coal through the medium of an especially designed grid burner.

At the plant of the Bethlehem Steel Company, Lebanon, Pa., there are four 520-hp. Babcock & Wilcox boilers that have been in operation approximately one year. The British Columbia Sugar Refining Company at Vancouver, B. C., has two 504-hp. Badenhausen boilers, two 250-hp. Babcock & Wilcox, nine 110-hp. horizontal return tubular and two 500-hp. Stirling boilers. The Puget Sound Traction Company at Seattle, Wash., has ten Babcock & Wilcox boilers from 300 to 600 hp., which have been in operation for about two years.

The foregoing installations are the only plants of any size using the powdered coal equipment. They are located in various geographical locations and operate on a wide range of fuel. From records of the plants operating results have been very satisfactory, according to Mr. Savage.

### RESULTS OF TESTS

A great number of tests have been made on powdered coal installations both by the local companies, by the Bureau of Mines and by the Combustion Engineering Corporation. The results of these tests have been presented in various technical articles in the technical press and show that the powdered coal installations are operating very satisfactorily. The effect of fineness and of moisture in coal has not been very marked, but questions of high ratings at high efficiency are still rather unsettled as until recently only a few plants have been designed for burning powdered coal and such tests as were available were taken on changeover plants formerly using other types of fuel-burning equipment. The tests show that the capacity is in direct proportion to furnace volume and that for existing furnaces the most efficient rates of combustion have been obtained when using 1 to 1½ lb. of fuel per cubic foot of furnace volume.

### GENERAL DISCUSSION

All of the plants now operated are designed to have the pulverized coal stored adjacent to the boiler and fired through the medium of specially designed feeders. There is a discussion at present in regard to firing the pulverized fuel directly from the mill to the combustion chambers without an interval of rest. But this method, while very simple and practical from a mechanical standpoint, is subject to several objections brought about by questions of reliability and efficiency. There are many mechanical units connected with the operation of the pulverizer and separator equipments which may get out of order with the result that fuel would fail of delivery to the boiler. Also in these systems the same air is used for separation and for firing, and it is very difficult to control this air in each instant so as to get a uniform mixture at the burner. The most serious deficiency of this system, according to Mr. Savage, is the lack of reserve supply of coal, which throws all the peak demand on the coal-preparing equipment at the time when the station load is at peak, while, on the other hand, a bunker supply permits separation of coal at off-peak intervals and also gives more reliability in the burning due to the elimination of hazardous mechanical arrangements.

In regard to installation costs, Mr. Savage states that if a modern central station using high-grade Eastern coal and average load factor is taken as a basis for the test it is doubted whether the net saving in favor of powdered coal would be better than 10 per cent, but considering the price such a station would pay for coal today the saving would in most cases warrant the additional expense. In an industrial plant having a varying mill load the saving with powdered coal would be more than with any other type of plant, due to its ability to serve fluctuating loads and to the saving during bank periods. In regard to the cost of fuel preparation, Mr. Savage states that in his opinion the cost of firing coal from coal car to ash car is not greater in a pulverized coal plant than in a modern stoker plant. This conclusion is based on some detailed calculations presented in the paper which consider all the auxiliary power for driving stokers and also the saving due to the exhaust steam heating the feed water. The figures on the assumed data show that the plant, when operating at 20,000 hp., burns 31 tons of coal per hour with a power requirement for preparing the coal of a little less than 20 kw. per ton.

### IMPROVEMENTS IN FIRING

In regard to the troubles in connection with the burning of powdered coal, the greatest trouble in the early attempts was from slagging. Proper furnace design and correct air admission have practically eliminated this trouble except with coal having a low fusing point, but even with these coals the trouble is confined to extremely high rating when coal in excess of 2 lb. per cubic foot per hour is burned. The use of water screens and multiple zones and other improvements are tending to eliminate entirely any trouble from slagging under high rating with any powdered fuel. In regard to the ash, at Milwaukee careful observation showed that 25 to 50 per cent remained in the combustion chamber, 5 to 12 per cent is collected in the second and third pass, 25 to 35 per cent is caught in the base of the stack and 12 to 25 per cent is lost in the stack. Studies are being made for eliminating the ash that goes through the stack, although it is so fine and flocculent that it causes no serious trouble. There has occurred no deterioration of the furnace brickwork and, in fact, boiler furnace maintenance has been reduced through use of powdered fuel.

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# Elimination of Waste

**Reports of the Federated American Engineering Societies, Prepared Under the Direction of Fifteen Engineers, Point Out Ways of Reducing Loss from This Cause**

DURING this week the Federated American Engineering Societies has made public extended abstracts of the general report of the committee on the elimination of waste, as well as of its detailed reports of the building trade and metal trade. An account of the work of this committee was published on page 1091 of the issue of this paper for June 11. The reports were prepared under the direction of fifteen engineers, known as the committee on elimination of waste in industry. The six industries studied were the building trade, men's ready-made clothing, boot and shoe, printing, metal trade and textile manufacturing.

A number of plants were studied intimately in each industry and a larger number gave additional information. The committee was named on Jan. 12, 1921, and six months later, or on June 15, 1921, the report was approved as a whole by the committee. While the transportation industry was not considered, some of the conclusions reached by the committee are applicable to all industries. In its general report the committee attributes the greater part of the waste in industry to:

1. Faulty management of materials, plant, equipment and men.
2. Interrupted production, resulting from idle men, idle materials, idle plants, idle equipment.
3. Restricted production intentionally caused by owners, management or labor.
4. Lost production caused by ill health, physical defects and industrial accidents.

Under faulty management the committee includes lack of standardization and machinery and methods, lack of cost control and accounting, high labor turnover, ineffective workmanship and faulty sales policies. Under the topic of interrupted production, the committee points out that in many trades there is seasonal unemployment, as well as that due to labor disturbances. There is also idle equipment because of overbuilt factories and idle material. Restricted production is brought about sometimes by managements and often by unions by restricting the use of machinery or requiring wasteful methods because of union rules. Under lost production, a rough estimate is given that the average loss per person per year from illness is thirteen days, and that 42 per cent of this illness is preventable. This is exclusive of time lost because of accidents.

Suggestions are made by which a number of these causes of waste can be overcome.

### REPORT ON BUILDING TRADES

In its report on waste in the building trades the committee estimates that $500,000,000 a year in wages in this industry is being lost through unemployment. The building industry ranks second only among the industries of the country in size and contributes to the wealth of the nation more than $3,000,000,000 yearly. The chief sources of waste are irregular employment, inefficient management and wasteful labor regulations.

Referring to irregular employment, the report says that the building trade workman is busy on the average about 190 days in the year, or two-thirds of his time. The public should be educated to the need of a more even distribution through the year of its construction demands and requirements. Haphazard management in planning and controlling work and lack of standards characterize most building undertakings. Union regulations have also produced enormous losses through direct or indirect restriction of output. Greater co-operation between the workmen and the employers is an absolute essential.

Management is blamed for failure to furnish continuity of employment, failure to plan work in sufficient detail, lack of proper schedules to allow proper co-ordination of scheduling, purchasing and delivery, with job requirements; failure to use proper amount or type of equipment, general failure to develop and use a greater amount of mechanical equipment, etc. Wasteful labor regulations, according to the report, consist of requiring skilled men to do work that could be performed by the unskilled, of restricting individual incentive through requiring uniform wages, of limiting the number of apprentices, of an excessive reduction of working hours, of restricting output by prohibiting the use of labor-saving devices, and of jurisdictional regulations. The strike is one of the greatest economic wastes to be found in the building industry, the report declares. In 1920 in Massachusetts 138,519 working days were lost because of strikes and lockouts, and if this figure is applied to the entire building industry, a waste of some 3,000,000 days per year is found.

REPORT ON THE METAL TRADES INDUSTRY

In its report on the metal trades industry, the committee estimates that the industry as a whole is operating at only about 60 per cent of normal output. It urges manufacturers to hasten a return to normal conditions by producing goods as economically as possible, so as to make selling prices low enough to attract buyers. Much stress is laid in the report on the cost of labor turnover. The average labor turnover for the year 1920, for the plants covered by these studies, was 160 per cent, and the highest turnover was 366 per cent. If 60 per cent of the separations are assumed as unavoidable, due to deaths, marriages, etc., there is still left in the average figure an avoidable or preventable turnover of, say, 100 per cent, and the industry with its 2,000,000 employees has 2,000,000 unnecessary separations. Expert estimates of the cost of labor turnover vary from $50 to $250 per employee hired, trained and separated. With an average figure of only $50, this item would mean a waste of $100,000,000 due to this one cause in this one industry.

The report also recommends an open interchange of ideas and business results by managements, both in the particular industry and in other industries, so as to lead to a higher level of methods, service and general business estimates. It also urges greater standardization, and in this connection it says:

> The great variety of designs called for by those who buy street cars, locomotives, trucks and other transportation equipment is well known to be capable of beneficial limitation if all manufacturers and users could, through some agency, get together and by scientific study of the problems, not only from a utility or service standpoint but from a manufacturing standpoint as well, reduce as much as possible the enormous number of varieties, styles and types now required to be built. Many of these varieties are largely a matter of personal opinion or judgment of the buyers who have not had the opportunity to study the subject in all its phases. A great deal can be done toward standardizing the designs of these products and thus promoting the best interests of all concerned.

### Correction in A. S. T. M. Report

The report of the meeting of the American Society for Testing Materials, as published in the July 16 issue of the ELECTRIC RAILWAY JOURNAL, page 103, intimated that the proposed tentative specifications for special quality carbon steel rails was adopted by the Association. Such action was not taken. At a meeting of Committee A-1, prior to the presenting of its report to the convention, it was voted to withdraw that specification, and it was accordingly referred back to the sub-committee. Consequently, all reference to it in Committee A-1's report was eliminated and the specification was not submitted to the convention.

Another typographical error occurred under the topic of corrosion of iron and steel in the reference to the tests made in the Pittsburgh district. The report as published stated that material with 0.06 per cent copper or more failed after five months exposure. This should read fifty-two months exposure.

### Iowa Association Meets at Lake Okoboji

THE Iowa Electric Railway Association held a joint meeting on June 24 with the Iowa section of the N. E. L. A. at Lake Okoboji, Ia. President H. E. Weeks, vice-president Tri-City Railway & Light Company, Davenport, Ia., was re-elected to this office for the ensuing year, as were also the other officers of the association.

Two of the papers presented before this meeting have already appeared in the ELECTRIC RAILWAY JOURNAL, one being on the "Sale of Securities by Utilities," by H. E. Weeks, which appeared on page 65 of the issue of July 9, and the other on "Valuation and Rate of Return," by L. B. King, appraisal engineer, United Light & Railways Company, Davenport, Ia., which appeared on page 104 of the issue of July 16. William Chamberlain and John A. Reed, both from Cedar Rapids, Ia., and respectively general counsel for the United Light & Railways Company and the Iowa Railway & Light Company, discussed the status of the Iowa laws pertaining to the regulation of utility rates. F. J. Hanlon, Mason City, Ia., gave the report of the legislative committee and reviewed the matters that had come before the Legislature of interest to the electric railways. A round-table discussion of wages, the open shop, rates of fare, jitneys, etc., occupied the meeting during the afternoon.

The next meeting will be held at Waterloo, Ia., on Sept. 16 and 17.

### Engineering Foundation Pushes Highway Research

PROF. W. K. HATT of Purdue University has been appointed director of the new Advisory Board on Highway Research of the National Research Council. In co-operation with other organizations, active research work on national highway questions will be started. The appointement of other committees to consider vehicle designs, economics and cost of transport, finance, traffic and construction are under advisement.

## American Association News

### Bus Committee Meets

ON JULY 15 the American Association committee on trackless transportation held its second meeting at headquarters. This meeting was for the purpose of going over the sub-committee reports that had been prepared since the meeting of June 24. Among those present were H. B. Flowers, United Railways & Electric Company of Baltimore, chairman, and the following members; C. B. Buchanan, Virginia Railway & Power Company; F. W. Fenn, National Automobile Chamber of Commerce, New York; G. A. Green, Fifth Avenue Coach Company; H. L. Howell, National Railway Appliance Company, New York; C. W. Kellogg, Stone & Webster Company, Boston; C. J. McPherson, J. G. Brill Company, Philadelphia; H. A. Mullett, Milwaukee Electric Railway & Light Company; Albert S. Richey, Worcester, Mass. Others in attendance were J. W. Welsh, acting secretary; L. D. Miller, International Motor Truck Company, and E. B. Warriner, assistant secretary National Automobile Chamber of Commerce, New York.

The sub-committees presented their reports so far as possible but many had found the time allowance too short properly to prepare their part of the report. The committee discussed in detail the question of publishing figures concerning the cost of motor bus operation. Mr. Welsh stated that there were many requests for this sort of information. Several thought such figures where available should be embodied in the report or at least made easy of access for those interested.

Another meeting is to be held the early part of September at which time the sub-committee reports will be correlated and put in final form for presentation at the convention.

### Stores Accounting Report Completed

ON JULY 25 the Accountants committee on stores accounting and the Engineering committee on purchase and stores met jointly at association headquarters. At this meeting the report of the committee on stores accounting was completed and turned over to Acting Secretary Welsh for printing. The report presents a proposed standard classification for material and stock records with forms to illustrate its use. The report also bears the approval of the purchase and stores committee.

Among those present were R. A. Weston, special accountant the Connecticut Company; W. H. Staub, United Railways & Electric Company, Baltimore; W. L. Davis, Lehigh Valley Transit Company, Allentown, Pa., and John Fleming, Capital Traction Company, Washington, D. C.

## Convention News

ACTING SECRETARY WELSH of the association announces that the reports of the T. & T. and Engineering Committees are already in the hands of the printer, and he anticipates now that they will be ready for distribution to members about the middle of August. In view of the fact that a special feature of the convention this year will be prepared discussions on these reports, this early distribution will enable a careful study which should be reflected on the floor of the convention.

The 1920 convention proceedings are now practically ready for distribution. The delay has been largely due to a prolonged strike at the printing plant in Albany. It is expected to ship the completed sets the early part of August.

Announcement is also made of the appointment of E. C. Faber, Aurora, Elgin & Chicago Railroad, as chairman of the convention entertainment committee. The balance of the personnel of this committee will be announced shortly.

## Committee on Standard Classification

THE publication in recent issues of this paper of a series of accounting questions and answers which have received the approval of the committee on standard classification of accounts of the Accountants' Association has brought to the office of the ELECTRIC RAILWAY JOURNAL several inquiries as to the history of this committee and its connection with the Interstate Commerce Commission. With the assistance of H. L. Wilson, treasurer Boston Elevated Railway and chairman of the committee, the following has been compiled:

The American Electric Railway Accountants' Association held an organization meeting in Cleveland in 1897, and at that meeting it was the opinion of those present that the most important thing for the association was the adoption of a standard system of accounts by which an intelligent comparison could be made of street railway reports. In consequence a committee of three, composed of C. N. Duffy of Chicago, William F. Ham of Brooklyn and J. F. Calderwood of Minneapolis, was appointed to submit such a classification.

This committee promptly performed its work and submitted a report at the first annual convention of the association, held at Niagara Falls in October, 1897. This report was carefully considered and a revised report was requested. The committee was continued, and at the next annual convention of the association, held in Boston in September, 1898, it submitted a revised report which was adopted, and the classification was recommended for general use by all railway committees.

This classification was in such form as to make it possible for the smaller companies to keep their accounts without undue trouble or expense, yet was so flexible as to make it entirely possible and practicable for the larger companies to keep their accounts in accordance and have all the detailed information they might desire. This classification was adopted previous to the general advent of interurban roads, but amendments to the classification to suit interurban practice were made and adopted at the convention of the association held in Atlantic City in October, 1907.

At about this time the Interstate Commerce Commission was considering the promulgation of a system of accounts to be used by all electric railways coming under its jurisdiction, and in February, 1908, the commission issued a tentative classification which subsequently, at a largely attended meeting held in Washington on May 12 and 13, 1908, was somewhat modified to meet the views of those representing the electric railways. The accountants' committee and representatives of the Interstate Commerce Commission spent the following week in making up a standard classification of accounts, which was adopted by the Interstate Commerce Commission to take effect from Jan. 1, 1909. This classification is still the standard classification of the Interstate Commerce Commission and the American Electric Railway Accountants' Association. While instructions have been modified since that date, the text of the accounts has not been changed. This system is not only the official one of the I. C. C. and the American Association, but it has been generally adopted by all the State commissions having jurisdiction over electric railway carriers' accounts.

At the time the text was prepared it was agreed by those in conference that if any questions were submitted direct to the Interstate Commerce Commission or to the American Association before any final replies were sent they should be jointly considered by both parties in interest. This arrangement has remained in force ever since, and the most harmonious relations have always existed between the Bureau of Accounts of the Interstate Commerce Commission and the Accountants' Association.

Up to the present time 653 communications have been submitted direct to the Interstate Commerce Commission and 112 direct to the Accountants' committee. Some of the inquiries have contained a dozen or more questions. Hardly a week has passed and at certain periods hardly a day without some questions relating to accounting matters being referred to the committee, and it is probably true that no committee of the American Electric Railway Association has been so constantly called upon for its service as has the committee on the standard classification of accounts.

### PERSONNEL OF COMMITTEE

There have been but few changes in this committee during the past twenty-four years. The present committee consists of William F. Ham of Washington, who has been a member of the committee since it was formed in 1897; H. L. Wilson of Boston, who has been a member of the committee since 1898; W. H. Forse, Jr., of Anderson, Ind., who has been a member since 1907; R. N. Wallis of Fitchburg, Mass., and P. S. Young of Newark, N. J., who have been members since 1914.

Other members of the committee have been as follows: C. N. Duffy, 1897-1905 inclusive and 1906-1908 inclusive; J. F. Calderwood, 1897-1905 inclusive; H. J. Davies of Cleveland, 1898-1900 inclusive; W. G. McDole, 1899-1907 inclusive; H. C. McKay, 1904-1905; Frank R. Henry, 1904-1907 inclusive; E. M. White, 1905-1906; W. B. Brockway, 1907-1914; F. E. Smith, 1908-1914.

C. N. Duffy was chairman from 1897 to 1905; Mr. Ham from 1905 to 1911, and Mr. Wilson since 1911.

## American Electrolysis Committee Completes Report

THE American committee on electrolysis, made up of representations of nine national organizations, has completed another report. From the nature of the problem it was decided that the entire report must be unanimously agreed upon by all the representatives of all interests. The committee on electrolysis of the American Electric Railway Association has accepted the report as representing a valuable contribution to the written material on the subject of electrolysis. Copies of the report, which goes to press on Aug. 1, will shortly be available to members at $1 each upon application to the office of the railway association.

The committee was first organized in 1913, and in 1916 it prepared a preliminary report confined exclusively to a statement of facts unanimously agreed upon and drawn up with the idea that it would form the basis of future constructive work. The entrance of the country into the war suspended the work, but with the resumption of peace the committee was reorganized and attacked its problems anew.

The work was subdivided into four parts, each of which was handled by a separate sub-committee; namely: Principles and definitions; design, construction, operation and maintenance; methods of making electrolysis surveys; the study of European practice. In addition to those there was a special research sub-committee organized to co-operate with the Bureau of Standards.

The American Electric Railway Association was represented on the committee by W. J. Harvie, chairman of the American Association committee on electrolysis; G. W. Van Dersee, assistant general manager Milwaukee Electric Railway & Light Company, and L. P. Crecelius, consulting engineer, each of whom served on different sub-committees. V. B. Phillips, consulting engineer, acted as expert adviser to the association's representatives.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## "Secret Books" Sought by State

Another move in the fight on the Chicago Surface Lines was made on July 19 when State's Attorney Crowe demanded that the companies' "secret books" be turned over to him. He did not intimate the purpose for this demand, but it was suggested by others that it had been inspired by Mayor Thompson, with whom the state's attorney is allied politically.

The request was in the form of letters to Henry A. Blair and Leonard A. Busby, executives of the companies making up the surface lines. Both sent replies "respectfully declining" to accede to the demand and explaining that there are no "secret books." Attorney James M. Sheean, for the Chicago Surface Lines, said:

> The books of the operating company, the Chicago Surface Lines, show all operating expenses. After they are audited the city gets 55 per cent of the net divisible receipts under the 1907 traction agreement with the city, and the other 45 per cent is split between the subsidiary concerns. Mr. Crowe's demand is merely a scheme to annoy the companies. He apparently wishes to know how the stockholders of the various companies spend their dividend checks.

Mayor Thompson has been trying for several years to get possession of these individual company books and has been refused by the Public Utilities Commission and the courts. The matter was set for a hearing before the new State Commerce Commission on July 27. Recently that body continued until Sept. 13 the hearing on the proposed abolishment of skip stops in Chicago.

## Connecticut Company's Outing

The annual outing of the employees of the Connecticut Company was held July 21 at Ocean Beach, New London, Conn. More than 400 gathered at Swift's Pequot Casino for a shore dinner. Music for the occasion was furnished by an employees' band of twenty pieces under the direction of I. A. May, comptroller.

After dinner, addresses were made by Mayor Morgan of New London, and James Hammond, secretary of the New London Chamber of Commerce. Mayor Morgan complimented the Connecticut Company on its efforts to render efficient service and wished the company the best of success in the future. Mr. Hammond said that he had always been an advocate of street railways and could not see why they should not always be a success when represented by such a highminded type of men.

Remarks were also made by President Storrs and Vice-President Punderford of the railway. Mr. Storrs announced that for the present the company would try to raise its standard of efficiency to the highest per cent so as to make the service the best in the country. Philip Hussey was the oldest employee at the outing. He has been in the service of the railway for fifty years.

The outing was a success and furnished the opportunity for renewing personal acquaintances that are not always possible during working hours. The only complaint seemed to be that the outings were held too infrequently. Fifty-two weeks seemed to be a very long interval.

## Mr. Chappelle Returns to New Orleans

C. C. Chappelle, New York, representing the security holders of the New Orleans Railway & Light Company, New Orleans, La., has returned to that city. F. W. Ballard, utility expert, engaged by the city to revalue the property of the railway, is expected in New Orleans shortly. It is anticipated that Mr. Ballard will bring his previous estimate of the value of the property of the company of $32,000,000, made in 1918, down to date. The arrival of Messrs. Chappelle and Ballard is expected to hasten action on the part of the city in reaching a decision that will give promise of a permanent solution of the city's trolley problem.

It is said that Mr. Chappelle returns to New Orleans clothed with power of attorney from the security holders of the company to negotiate a settlement. He said:

> I have returned to New Orleans in the interests of the security holders' committees of the New Orleans Railway & Light Company, whom I represented in the negotiations some weeks ago and whom I continue to represent.
>
> Due to ill health I was unable—in connection with those negotiations—to complete certain investigations in reference to operating and physical conditions of the property.
>
> While the delay is to be regretted, the general exchange among yourselves as to views, methods, means and conditions to be met for the permanent solution of your utility problem should be helpful and progress has been made.
>
> It was my privilege to present and discuss some of the laws of economics and business principles affecting the solution of your public utility problem.
>
> My position then and now is that a permanent solution, can only be accomplished by co-operation of the public and through constructive action by the Commission Council. I can add nothing further to my previous expressions.

**Negotiations to Select Neutral Members.**—Negotiations are taking place to select a neutral member of the board of arbitration in the wage dispute between the Schenectady (N. Y.) Railway and its employees. The men are now working at 45 cents an hour, which is the company's proposal pending the result of the arbitration proceedings. The rate fixed by the board will be retroactive to May 1.

## Ordinance Introduced to Oust Detroit United Railway

The fight between the city of Detroit and the Detroit United Railway was renewed when the ordinance was introduced into the City Council to require and direct the railway to cease operation of its cars upon and over sections of Fort Street and Woodward Avenue where franchises have expired, and remove therefrom all its property, and providing for the time within which it shall be done.

The ordinance was introduced upon the request of Mayor Couzens after the city's offer for the lines in question had been rejected by the company. The ordinance was read twice by title and ordered printed and laid on the table, no further action to be taken for one week. This is the first effort on the part of the Mayor to have the D. U. R. ejected from the streets.

While it has been conceded that there is nothing to prevent the company from dispensing with service on the lines immediately, the Mayor believes that such action will not be taken by the company, since it would interrupt interurban service.

According to Joseph S. Goodwin, of the municipal system, the only value that the tracks represent to the people of Detroit is the estimated value that can be placed on them as a means of transportation for the people until such time as the tracks can be entirely rebuilt to carry heavy traffic, or until more advanced means of transportation are provided. The Mayor stated that out of consideration for the public the offer had been made for the line to make the transfer of ownership as easy as possible for the railway patrons.

The Mayor proposes to lay temporary tracks necessary to preserve service. To care for the Woodward Avenue traffic, railway lines will be built by the city for its cars on paralleling streets, one block each side of Woodward Avenue.

Since the recommendation has been handed down by the Utilities Commission as to the proper type of crossing to install where the city tracks cross existing tracks of the Detroit United Railway, work is being pushed with a view to getting the crossings installed so that service can be started on the additional city lines.

W. E. Davis, Cleveland, has been named as the third member and chairman of the board of arbitration, which will endeavor to fix the price that the city will pay for the day-to-day line. Prof. Henry E. Riggs and William H. Maybury are the other members of the board. Professor Riggs will be the company's representative. Mr. Maybury will represent the city.

## Wage Cuts in New York

### Interborough, Brooklyn Rapid Transit and Brooklyn City Employees Accept Ten per Cent Cut

As a result of recent negotiations between Frank Hedley, president and general manager of the Interborough Rapid Transit Company, and the Brotherhood of Interborough Rapid Transit employees, the men accepted a 10 per cent reduction in wages effective July 24. The new agreement, which will remain in force until June 30, 1922, affects about 15,000 men, who shared in the increase of June, 1920. Its effect upon the company is a saving of about $2,600,000.

The old and new wage agreements are as follows:

| | — Cents per Hour — | |
|---|---|---|
| | Old Rate | New Rate |
| Motormen | 86 | 78 |
| Guards | 58 | 53 |
| Laborers | 48–58 | 44-53 |
| Mechanical forces | 65-80 | 58–72 |

In its request of July 8 the company placed before the committee of the Brotherhood of Interborough Rapid Transit Employees the fact that a receivership certainly faced the company unless some tangible saving in the revenue could be effected. On receipt of the acceptance of the new working arrangement the management expressed its appreciation of the men's co-operation.

A similar wage reduction for employees of the Brooklyn Rapid Transit Company to become effective Aug. 5, has been announced by L. M. Garrison, receiver of the property. This reduction for old employees averages substantially 10 per cent, with a greater reduction in rates of pay for some classes of new employees.

For conductors and motormen on the surface lines the following schedule will be in effect:

| | — Cents per Hour — | |
|---|---|---|
| | Old Rate | New Rate |
| Grade A (5th year of service and thereafter) | .. | 60 |
| B (4th year of service) | 67 | 55 |
| C (3rd year of service) | 62 | 52 |
| D (2nd year of service) | 59 | 50 |
| E (2nd six months of service) | *57 | 48 |
| F (1st six months of service) | *57 | 45 |

* Same rate of pay prevailed for first year.

Existing schedules are to be changed as soon as practicable so as to provide for all regular runs a minimum of eight hours and forty-five minutes, with a maximum of ten hours and thirty minutes, with the understanding that as many runs be made ten hours as may be found practicable.

Work in excess of ten hours and thirty minutes to be paid for at the rate of time and one-half.

All time allowances as provided for in the former regulations, except such as may be necessary to maintain a minimum of eight hours and forty-five minutes for regular runs, will be eliminated.

For conductors and trainmen of the rapid transit lines the scale is as shown in the table at the bottom of this page.

Under the old rate conductors on the rapid transit lines for the first six months received 59 cents, next twelve months 60 cents and after eighteen months 62 cents. The guards for the first six months were paid 53 cents, next twelve months 54 cents and after eighteen months 57 cents.

Schedules are to be arranged so that 50 per cent of the swing runs shall be completed within a spread of twelve hours, and the other 50 per cent within a spread of thirteen hours.

A similar reduction in rates of pay and changes in working conditions, effective the same date, will be made and applied to all other classes of hourly-rated employees whose wages were increased in accordance with the receiver's notice of July 16, 1920.

This same general average reduction in rates of pay will also apply to all classes of the clerical and supervisory forces which received the increase authorized by the receiver's notice of July 16, 1920. In cases where any individual or class in the clerical and supervisory forces was increased last year by an amount less than the percentage applying to the hourly-rated employees, the reduction made effective Aug. 5, 1921, will be correspondingly less.

This reduction does not apply to the 800 motormen, signalmen and towermen of the Brooklyn Rapid Transit system who are members of the Brotherhood of Locomotive Engineers. Their agreement does not expire until Jan. 1, but it is reported that they are considering a suggestion by the company to accept a similar reduction.

H. Hobart Porter, vice-president and general manager of the Brooklyn City Railroad, stated that arrangements similar to those announced by Receiver Garrison as having been agreed to by the employees of the Brooklyn Rapid Transit System would be made with the employees of the Brooklyn City Railroad, the negotiations leading to these arrangements having been carried out jointly by the receiver and the Brooklyn City Railroad.

| | | Cents per Hour |
|---|---|---|
| Conductors. | Grade A (3rd year of service and thereafter) | 55 |
| | B (2nd year of service) | 54 |
| | C (1st year of service) | 53 |
| Trainmen. | Grade A (5th year of service and thereafter) | 51 |
| | B (3rd year of service) | 49 |
| | C (2nd year of service) | 47 |
| | D (2nd six months of service) | 46 |
| | E (1st six months of service) | 45 |

## Montreal Would Cut Men 20 per Cent

An amicable outcome is expected in the negotiations between the Montreal (Can.) Tramways and its employees arising from the company's proposal to put into effect on Aug. 1 a wage reduction of 20 per cent. The majority of the men are showing a conciliatory attitude, and each side has been meeting the wishes of the other in the matter of conferences to discuss the situation. Several of these informal meetings have been held within the past week, but on July 25 matters had not yet reached a stage where a definite result could be announced.

The present rate of wages is as follows: Conductors and motormen—first year, 45 cents an hour; second year, 50 cents an hour; third year and subsequent years, 55 cents an hour. Inspectors, instructors and depot clerks (day), $175 a month. Depot clerks (night), first year, $160 a month, thereafter $170 a month. Track sanders (hill men), 85 cents an hour.

This scale has been in effect since July 1, 1920, and represents an increase of approximately 20 per cent over that in force for the previous year, which in turn was 30 per cent higher than that in force before July 1, 1919. The company's proposal, therefore, will restore the scale approximately to that in effect from July 1, 1919, to July 1, 1920.

The present maximum of 55 cents an hour represents an average increase of 131 per cent over the maximum of 25 cents in force in 1914, although in the case of the younger men the percentage of increase was considerably higher.

In April of this year, J. E. Hutcheson, general manager of the company, notified A. Lacombe, president of the employees' union, that it was the company's intention to terminate the existing agreement on wages and working conditions, which was entered into on Aug. 27 of last year, and was based on the award of a board of conciliation and enquiry appointed by the Dominion Department of Labor. The agrement covered the year from July 1, 1920, to June 30, 1921, and was automatically renewable by default of either party to give at least thirty days' notice of intention to discontinue the same. By agreement, the status quo was continued in July, pending the company's submission of a proposal to the men, and early in the month the union was notified of the proposed 20 per cent reduction. Failing an agreement by negotiation, the issue will probably be submitted to arbitration, and there seems no immediate danger of a strike.

**Arbitrators Reduce Pay Scale.**—The pay of motormen and conductors in the employ of the Youngstown & Ohio River Railroad, operating an interurban line between East Liverpool and Salem, has been cut 5 cents an hour. The old scale was from 55 to 65 cents an hour. The new award, the result of arbitration, is retroactive to July 1.

## Mr. Gadsden on Chamber of Commerce Transportation Committee

The Chamber of Commerce of the United States has just announced its appointments for the ensuing fiscal year of the personnel of two committees dealing with the subject of transportation and communication. Under the departmental organization of the national chamber, an executive committee for the department of transportation and communication has been appointed, the members representing the various divisions of the industry. The committee consists of the following men:

Chairman, Howard Elliott, New York; vice-chairman, Lewis B. Stillwell, New York; utilities—Edwin O. Edgerton, San Francisco; railroads—George A. Post, New York; and Wilmer W. Salmon, Rochester; marine—H. H. Raymond, New York, and J. M. Whitsitt, Charleston; highways—A. J. Brosseau, New York; electric railways—Philip H. Gadsden, Philadelphia; waterways—Douglas Fiske, Minneapolis; port terminals—B. F. Cresson, Jr. New York; communications—John J. Carty, New York; postal—Lucius Teter, Chicago.

The chamber has also appointed a special railroad committee with George A. Post, chairman.

The departmental plan of the chamber with respect to transportation and communication is a recent development of the work of the United States Chamber and this department has been organized under the direction, as manager, of J. Rowland Bibbins, formerly supervising engineer of The Arnold Company, Chicago. The department will carry on the former work of railroad and marine transport with Richard Waterman and N. Sumner Myrick, formerly secretaries of the railroad and marine committees, and this work will be extended into other related fields of transportation. It is expected that highways, waterways and electric railways will occupy immediate attention.

## Wage Reduction Proposed in Kentucky

A general reduction in wages of all employees of the South Covington & Cincinnati Street Railway, amounting to approximately 10 cents an hour, has been submitted by the company to members of the railway union at Covington, Ky., for their approval.

Provided the men agree to accept the new wage scale it will go into effect on Aug. 7, when the present agreement expires. If it is rejected, the question will be submitted to an arbitration board for settlement.

The proposed new scale for conductors and motormen on the Green Line fixes 45 cents an hour for the first three months, 48 cents an hour for the next nine months and 50 cents an hour thereafter. Their present scale is 54 cents an hour for the next nine months and 60 cents an hour thereafter.

The new scale for carhouse men and other employees ranges from 30 cents to 51 cents an hour against the present scale of from 45 cents to 62½ cents an hour.

Extra men at present are guaranteed 210 hours or $105 a month. They are offered a straight salary of $75 a month under the new scale. The present scale has been in effect since Aug. 7, 1920.

The new scale is equivalent to the reduction in wages recently put into effect after negotiations between employees and officials of the Cincinnati (Ohio) Traction Company.

The men have since rejected the reduction proposal.

## Power Hearings at Toledo in August

Announcement has been made at Toledo, Ohio, that the power rate hearing before the Ohio Public Utilities Commission has been set for Aug. 3, 4 and 5. The points at issue will be the valuation of the property of the Toledo Railways & Light Company, used in producing the power; the depreciation on the plant; rate of return on investment; and whether or not a demand charge or a fixed charge shall be made along with a consumption charge.

The Rail-Light has proposed a charge of $30 a year per kilowatt of demand and 1¼ cents per kilowatt-hour for energy actually used. This is regarded as so excessive by the street railway commissioner that he has made no offer to the company.

So far the company has been paying approximately 2.40 cents per kilowatt-hour for power. Whatever excess there is in this will be refunded to Feb. 1 when a rate is finally established and approved by the commissioner.

Prof. H. E. Riggs, of the University of Michigan, who was engaged to value the properties and assist in the presentation of the case has worked out five valuations on different bases. The Rail-Light wants its rate to be set on basis of a 1919 reproduction valuation of the plant.

It is believed that action by the utilities commission may be final in settling the dispute which has gone since the beginning of operation under the service-at-cost plan. It also may tend to wipe out considerable of the deficit already piled up.

## Interurban Cuts Wages

Announcement has been made by the Marion & Bluffton Traction Company, Marion, Ind., of wage cuts effective on Aug. 1 which affect every class of employees. The average reduction will be approximately 12½ per cent, with the range in reductions running from 10 to 15 per cent. Trainmen will have their wages reduced 5 cents an hour while section hands will be cut from 30 cents to 25 cents an hour for a ten-hour day.

In its statement announcing the reduction the company declared that the lower wage scale is in line with a general retrenchment policy. It is alleged that receipts have shown a notable falling off during the past year.

## Dayton Strike Settled

The strike of the electric railway employees at Dayton, Ohio, was terminated on July 21, following the signing of an agreement between the Peoples' Street Railway and the Dayton Street Railway and their employees. The walkout occurred on July 6.

Both sides claim victory, and the resumption of service finds both parties to the contest in amicable mood, apparently. The principal point at issue was that of wages. The company offered 45 cents an hour and the men demanded 52 cents. The men formerly received 62 cents, but under the agreement will receive 48, a compromise rate.

The men feel that they gained not a little by the terms, with the inclusion of arbitration and working agreement clauses in the settlement. The company is elated over the settlement in favor of the "open shop."

As a result of the settlement of the controversy and the acceptance on the part of the men of a lower wage, the City Commission of Dayton is expected to reduce the fare from 7 to 5 cents. Steps are being taken toward that end at the present time.

It is anticipated that similar wage and working term agreements will be entered into by the Oakwood Street Railway and the Dayton & Xenia Electric Railway.

## Canadian Radial Hearings Concluded

The long drawn-out inquiry into the advisability of the Hydro-Electric Commission of Ontario embarking on a large scheme of radial railway construction and operation terminated on July 2 with the summing up by I. F. Hellmuth, K. C., counsel for the commission. Mr. Hellmuth's argument was distinctly hostile to the undertaking.

In dealing with the financial aspects of the proposition, he referred to the evidence of E. C. Clarkson, chartered accountant, who had shown the large provincial commitments already undertaken and pointed to the danger of straining provincial credit and having to pay higher rates of interest for borrowed money. As a result of their borrowings, the government and the Hydro Commission had forced the interest rate on capital up to more than 6 per cent. Ontario was committed to the policy of public ownership, but it could not force this policy down the throats of United States bankers and financiers who advised the investors.

In consequence it would be difficult to float bonds for publicly-owned hydro radials in the United States. Money could not be raised in England. Investors there, instead of buying Canadian securities, were sending what they already held to Canada for sale. The money, if required, would have to be raised in Ontario.

Testimony at the hearings has been published from time to time in the ELECTRIC RAILWAY JOURNAL extending over a period of months.

## Wages Cut on Key Route

By a vote 425 to 201, platform men of the Key Route and traction lines of the San Francisco-Oakland Terminal Railway have voluntarily accepted a reduction in their wages of 6 cents an hour. The new schedule will become effective on Aug. 1.

W. R. Alberger, general manager of the company, in a joint statement with W. J. Moorehead, president of the union, said that investigations were made and statistics of the United States Department of Labor consulted in fixing the rate.

The new wage scale follows:

Traction Line—First three months, 52 cents an hour.

Next nine months, 55 cents an hour.

Second year and thereafter, 59 cents an hour.

Key Route—First three months, 54 cents an hour.

Next nine months, 57 cents an hour.

Second year and thereafter, 61 cents an hour.

The new scale is the result of conferences between the company and the union officials. These conferences were made possible by an agreement made a year ago whereby either side could open negotiations for an adjustment of wages every six months.

## Plea Rejected to Set Aside Arbitration Award

A. C. Blinn, vice-president and general manager of the Northern Ohio Traction & Light Company, Akron, Ohio, has refused union pleas to set aside the recent wage arbitration award. Following the decision of the arbitration board, the men appealed to the company to disregard the award.

In a letter to W. B. Fitzgerald, vice-president of the Amalgamated Association, Mr. Blinn reviewed the whole chain of circumstances leading up to arbitration. It was only after a strike of seven days during which the public served by the company was greatly inconvenienced and the company lost in receipts about $150,000 that the men agreed to accept arbitration. Mr. Blinn dismisses the contention that the wages awarded were not comparable with wages paid on other properties by citing wage scales on the Cleveland interurbans.

On the very important issue of the direct request to ignore the award of the arbitration board Mr. Blinn said:

> This award was from 1 to 2 cents an hour lower than the offer the company made before the trainmen went out on strike. Neither the wage offered by the company to prevent a strike, nor the wage requested by the men was involved in the arbitration proceedings. The function of the board of arbitration was to determine a reasonable wage and in rendering its award we must assume that neither the wage offered by the company nor the wage requested by the men had anything to do with the board's judgment as to what was a reasonable wage under all the circumstances; certainly the members of the board were not entitled to consider either.
>
> Inasmuch as both sides solemnly agreed to be bound by the award of the arbitrators the company does not feel that it should be called upon to disregard the award any more than the trainmen would so feel in the event the board of arbitration has awarded them the wage they requested and the company should now be calling upon the trainmen to disregard the award of the arbitrators and voluntarily reduce their wages. If the trainmen had been awarded the wages they requested, notwithstanding the payment of it might have put the company in bankruptcy, the company would have been held strictly to the award and it would have been subjected to much ridicule by your organization had it suggested that the award be set aside in its favor.
>
> Your request cannot be granted. To do so would make a complete farce of the arbitration proceedings. It would establish a most dangerous precedent by which future arbitrations would to a great extent be affected not only in arbitrations between this company and its employees, but arbitrations for the settlement of labor disputes throughout this territory.

## Beaver Valley Wages Reduced

A new wage agreement was concluded by the Beaver Valley Traction Company, New Brighton, Pa., with its trainmen on July 18. The rate of wages for the trainmen in the employ of that company and the Pittsburgh & Beaver Street Railway during the period beginning May 1, 1921, and ending April 30, 1922, both inclusive, follows:

| | |
|---|---|
| From May 1, 1921, to May 31, 1921: | |
| First three months | 54 cents |
| Next nine months | 57 cents |
| After one year | 63 cents |
| From June 1 to June 30, 1921: | |
| First three months | 49 cents |
| Next nine months | 52 cents |
| After one year | 58 cents |
| From July 1 to April 30, 1922: | |
| First three months | 44 cents |
| Next nine months | 47 cents |
| After one year | 53 cents |

The 5-cent reduction in June was made effective by reason of an agreement entered into on June 7 and made retroactive as of June 1.

As noted in the ELECTRIC RAILWAY JOURNAL for June 18, W. H. Boyce, general manager of the company, recently asked his trainmen to assume a part of the $93,000 loss which faces the company for the coming year.

## Interurban Men Cut 16 2-3 per Cent

The wage controversy between employees and management of the Rochester & Syracuse Railway, Syracuse, N. Y., was settled on July 24 by a decision of the arbitration board announcing a 16⅔ per cent cut. This reduction brings the wages of platform men from 62 to 52 cents an hour for a ten-hour day. A proportionate reduction also affects substation operators, ticket men, bridge and shop men. Common laborers must submit to a 26 per cent cut.

The Empire State Railway's employees will receive $4 94 a day or 25 cents less than the Rochester & Syracuse men. They will work on a nine-hour-day basis.

Arrangements are pending for a private arbitration between the employees and management of the Auburn & Syracuse property.

**Number of Trainmen Reduced.**—Following refusal of members of the union to accept a wage reduction the Wheeling (W. Va.) Traction Company laid off forty men and began operation of one-man cars in order to curtail expenses.

## Court Orders Wages Reduced

E. J. Triay, receiver for the Jacksonville (Fla.) Traction Company, has secured an order from Judge R. M. Call of the United States Court for the southern district of Florida, authorizing the reduction of wages of trainmen, 2 cents an hour. The scale starting at 40 cents under the old order, drops now to 38 cents.

The increase in fare to 7 cents has cut travel, according to statistics produced by the receiver and while the advance from 5 to 7 cents was a 40 per cent increase, receipts have advanced only 7 per cent during the twenty-eight weeks of 7-cent fare.

Under these circumstances the receiver appealed to the judge, saying that a further fare increase would not suffice, leaving the reduction of operating expense as the only avenue open. He stated that other departments were accepting reductions similar to those proposed for the trainmen—5 per cent.

Wages of the trainmen have been increased almost 100 per cent since 1914.

## East St. Louis Cuts Wages

A threatened strike of motormen and conductors (Amalgamated) of the East St. Louis & Suburban Railway East St. Louis, Ill., has not materialized following the failure of the effort of the men in United States District Court to restrain the company from paying 51 instead of 70 cents an hour on the July payroll.

The employees had declared they would not accept the cut in pay which went into effect on July 1. The Federal Court ruling was handed down on July 23, and on July 25, all of the employees of the company had accepted their pay envelopes.

In his decision, Federal Judge English also denied a motion to dissolve the temporary injunction restraining a board of arbitration from holding hearings in an effort to decide a wage scale for motormen and conductors, the board being composed of William Maffitt Bates, an attorney, as chairman; Hunter B. Keith, representing the union, and C. E. Smith, a consulting engineer, representing the company.

Judge English pointed out the fact that Mr. Smith was forced to resign on account of pressure of other business. The two other members had continued to hold meetings and Judge English in his decision held that without Mr. Smith the board had no authority. In effect, the body ceased to be a board of arbitration.

W. H. Sawyer, president of the company, has offered to have the wage question submitted to a new board, but the men have declined. They are now waiting on the final decision of whether the temporary injunction shall be made permanent. In the meantime the company went back to and is paying the scale which the War Labor Board established and which was in effect until April, 1920.

# Financial and Corporate

## $93,500,000 Cut in Capital

### Pittsburgh Reorganization May Be Carried Out on This Basis—Definite Proposal Made

A definite plan for the reorganization of the Pittsburgh Railways was presented to the Council of that city on July 25. The plan was embodied in an agreement proposed to be executed by the city of Pittsburgh, the Philadelphia Company and the Pittsburgh Railways.

The plan contemplates the reorganization of the Pittsburgh Railways or the formation of a new company to take over all the assets of the railway and to be limited to $62,500,000 in the issuance of stock, bonds or other securities in substitution for securities now outstanding, amounting to $156,000,000. An annual return of 6 per cent for ten years is allowed on the new capitalization, which is the value of the railways properties fixed by the Public Service Commission.

The city and contiguous municipalities are given a voice in the annual operating expenses and yearly depreciation allowance, under the plan, and a fixed annual charge is agreed upon in lieu of tolls, taxes and street cleaning, and for street repaving for which the company is obligated, the city being authorized to proceed with this work.

The plan is the result of conferences of A. W. Thompson, president of the Philadelphia Company, with Council and Mayor E. V. Babcock.

The agreement that is now proposed containing the provisions as accepted by both sides, was submitted by George N. Monro, Jr., special assistant city solicitor, and approved by City Solicitor Charles B. Prichard. In an accompanying letter they recommended its execution.

### CONTRACT CANNOT BE FLAWLESS

Mr. Monro in his letter of transmittal said that in this complex matter one could not be expected to prepare a contract that would be above criticism or that would contain every necessary detail. The negotiators were firmly convinced, however, from their study of the problem that the principles of the contract were sound and that its execution would go a long way toward ending the litigation and permitting the reorganization of the company so that it could start anew by properly functioning in the public service.

It was his opinion that the time had come for the company and the city to use every effort to stop litigation and have the property returned to the owners so that they might have an opportunity to reorganize on a sound financial basis. This could be done only by fixing a fair value on which the securities could be based and by agreeing upon a fixed return beyond which the company could not collect.

He made it plain that the opinion of the negotiators was that the details of the reorganization was a problem between the company and its security holders, their lawyers and financiers. These were private questions of no public concern and the city should not interest itself in these details.

### SHOULD INVITE COMMENT ON PLAN

Mr. Monro recommends that before any steps are taken to adopt or reject the proposed contract, which states the terms the negotiators are willing to recommend for adoption by the respective principals, the contract should receive the widest publicity and constructive criticism should be invited to it. The controlling thought in the preparation of the contract was that the community is entitled above all else to a service at a reasonable fare. This is purely a matter of money and management.

### $5,000,000 FOR BETTERMENTS

A necessary initial step in the reorganization is the raising of $5,000,000 to be spent in betterments, improvements and rehabilitation of the railway system. The Philadelphia Company controlling the Pittsburgh Railways proposes to assist the new company in borrowing this sum in the Pittsburgh district. The obligation so created will, of course, be added to the proposed capitalization. In this connection it is stipulated that the directors of the new company shall be residents of Pittsburgh.

The rate of fare under the plan is to be regulated by the surplus or deficit in receipts compared to budget requirements and guaranteed return, and either the city or the company is empowered to apply to the Public Service Commission for an increase or reduction in fares as the surplus or deficit warrants.

The execution of the agreement and its approval by the Public Service Commission, with the capitalization of $62,500,000, will terminate the case in which the city has attacked the valuation of the railway property. This case is now before the Superior Court on appeal.

A. W. Thompson, president of the Philadelphia Company, in commenting on the text of the proposed plan for the reorganization said that if the companies were left to themselves and urged foreclosures and took steps to realize everything possible in their interest from the present situation, chaos in Pittsburgh's street transportation would result. The purpose of the plan now advanced, Mr. Thompson said, was to maintain one system of electric railways on a financial basis that would endure for years to come.

## Federal Courts in California Rule on King Tax Bill

An order denying the motion of the Southern Pacific Company and the Atchison, Topeka & Santa Fé Railway for an injunction to suspend operation of the King tax bill was issued on June 30 by the three federal judges hearing the action. The motion included an application to prevent the state from collecting any tax in excess of the present 5¼ per cent levy on gross revenues, which tax the King bill raises to 7 per cent. This decison of the court proposes that the railroads should continue to pay the 5¼ per cent tax, however, until the case can be tried on its merits.

The opinion, which was written by Justice W. W. Morrow of the United States Circuit Court of Appeals, held that the railroads should attack the King bill purely on constitutional grounds and should not bring in collateral issues directed against the whole tax system. The decision directed the Southern Pacific to pay into the state treasury $6,125,700 due under the 5¼ per cent levy. The King bill would increase this figure to $8,167,600. The Santa Fé was ordered to pay $1,833,404 under the 5¼ per cent tax. Its annual tax under the King bill will be $2,444,539.

## Interurban Elects New Officers

Isaac Loewenstein, president of the Charleston National Bank, Charleston, W. Va., has been elected president of the Charleston-Dunbar Traction Company, the stock of which he recently purchased. F. M. Staunton, president of the Kanawha Banking & Trust Company, has been elected vice-president; A. H. Hill, treasurer, and E. W. Alexander has been re-elected superintendent. The board of directors is composed of Messrs. Loewenstein and Staunton, F. P. Gross, W. A. MacCorkle and I. N. Smith.

Mr. Hill, the new treasurer of the Charleston-Dunbar Traction Company, is treasurer of the Charleston Interurban Company; Mr. MacCorkle is president, and Mr. Smith is general manager.

At the time the sale of the Charleston-Dunbar Traction Company was announced Mr. Loewenstein said he was making the purchase for other parties, but that he could not at that time make known the names of the parties for whom he was acting.

There has been considerable talk of a consolidation of the two roads, but officials of both roads so far have declined to discuss the matter. The fact that the new officers of the Charleston-Dunbar Traction Company are also officials of the Charleston Interurban Company gives added import to the report that a consolidation is in process.

## Second Fare Zone Results in Profitable Operation

The Manhattan & Queens Traction Company, New York City, is now operating on a paying basis according to W. B. Duncan manager for the receivers. This success is due to the second zone fare put into effect many months ago by the Public Service Commission following a strike of the employees for an increase in wages.

The second 5-cent fare zone begins at Grand Street, Elmhurst. Passengers travel from Manhattan to Elmhurst for 5 cents and from that point east to Jamaica another 5-cent fare is collected.

Mr. Duncan said recently that from 1913, when the company started to operate on the Queens Boulevard, until 1916 2½ per cent a year was paid to stockholders. The year following there was no return to investors and in 1918 $3,000 was cleared above operating expenses. In 1919 the company suffered a deficit of $9,000 and in 1920 and until the strike of this year there was a deficit of $19,000. Mr. Duncan said in part:

> Wages of employees were raised 128 per cent and the operating expenses were likewise on the increase.
>
> We feel that no one is paying too much for the convenience of a ride on the Queens boulevard trolley. We are willing to concede anything for the benefit of the people if they do not demand to take money away from us. We are willing to meet them halfway.
>
> We cannot reduce our revenue, however, and we will refuse to consider it. The second fare is now placing the company on a paying basis for the first time in many years. We are paying our wages and all other bills.

## Eastern Massachusetts Does Better

The trustees of the Eastern Massachusetts Street Railway, Boston, Mass., report for six months ended June 30, 1921, as follows:

| | 1921 | 1920 |
|---|---|---|
| Operating revenue and income...... | $5,637,858 | $6,679,949 |
| Operating expenses and taxes........ | 4,462,613 | 6,668,555 |
| Gross income.'... | 1,175,244 | 11,394 |
| Bond interest and rentals .......... | 800,626 | 772,050 |
| Net income...... | $374,618 | def $760,656 |

In the six months of 1921 the "cost of service" ($1,174,875), as defined by Chapter 188 of the Special Acts of 1918, was earned by a slight margin. In the same period of 1920 the company failed to earn the "cost of service" by $1,368,605.

## United Railways Aided

The North American Company, owning large interests in the United Railways, St. Louis, Mo., which is now in receivership, has underwritten $1,474,000 of bonds for an extension of twenty-six months at 8 per cent, following the rejection of a proposition to issue receiver's certificates in this amount at an interest rate of 10.198 per cent.

The original bond issue of the old Lindell Railway, a constituent line of the United Railways, was made in 1891. It bore 5 per cent interest over a twenty-year period, and there was a renewal for ten years at 4½ per cent. The bonds are due on Aug. 1. When the question of refunding was taken before the Missouri Public Service Commission recently and it was found that receiver's certificates would have to bear a rate of more than 10 per cent, the North American Company stepped in and agreed to the underwriting at 8 per cent.

The application of Receiver Wells to accept this arrangement was approved in Federal Court on July 21.

## City Seeks to Operate Line at Present Suspended

The city of New York through Corporation Counsel John C. O'Brien has filed a brief with Federal Judge Edward Garvin in Brooklyn in connection with the city's application for a modification of the order of Judge Chatfield restraining the city from intervening in the foreclosure sale of property of the New York & North Shore Traction Company.

The city protests that the receivers of the railway have refused to operate the lines although they had been fully authorized to do so and that they proposed shortly to sell the property as junk, thereby rendering the city unable to secure its claims to the tracks and wires and preventing municipal operation except at great expense.

In asking for the modification of the order of Judge Chatfield, the city seeks the right to operate the line until the legal questions of ownership are settled "instead of allowing the property, as at present, to rust and rot."

## Seattle Expects to Go Behind in 1922

Reductions totaling $620,321 are announced by Mayor Caldwell of Seattle, Wash., in the cost of operating the tax-supported departments of the city government during the year 1922, as compared with 1921.

Estimates filed by the street railway department showed a reduction in operating expense for next year of $621,142. The cost of operation and maintenance in 1922 is estimated to be $4,703,586, where in 1921 it was $5,334,728. The decrease includes a reduction of $423,760 in trainmen's wages, effected by rerouting cars, and use of more one-man cars. The estimate also includes a decrease of $100,000 in the cost of general supplies, a saving of $35,000 for power and other small economies.

The total cost of the railway for the year 1922, if it paid all debts of interest, payment of principal, is $6,898,085. This would include the $833,000 due to the Stone & Webster interest next March, and a $200,000 depreciation fund. Estimates of the 1922 revenues are in preparation. Superintendent Henderson of the railway expresses the opinion that they will be insufficient to meet the year's expenses.

## $650,000 Loan to Cincinnati Traction Company

Terms of the agreement by which the Cincinnati Street Railway will lend the Cincinnati (Ohio) Traction Company $650,000 have finally been agreed upon. A notice of this was received by William Jerome Kuertz, director of street railways, Saul Zielonka, city solicitor, and Charles Hornberger, service director, as a committee representing the city administration, from Bayard L. Kilgour, president of the Cincinnati Street Railway. In making the loan, it is expressly stipulated that the Cincinnati Traction Company shall proceed at once with certain improvements and extensions heretofore agreed upon with the director of street railways.

Mr. Kilgour points out in his letter that the action of the railway in making the loan is entirely "voluntary," and that, "it is not the present intention of the Cincinnati Street Railway to make any loans to the Cincinnati Traction Company in the future." He states further that the present loan must be repaid by Jan. 1, 1922.

Officials of the traction company said that as soon as the funds from the Cincinnati Street Railway are made available, no time will be lost in beginning on certain improvements and extensions listed in the company's program.

## Employees Asked to Become Shareholders

The Northern Ohio Traction & Light Company, Akron, Ohio, has started a sale of its 7 per cent cumulative preferred stock to its employees and customers. Every employee is urged to become a business partner and a shareholder in the company.

This campaign is being launched to add new capital to the company to enable it to meet the demands of the growing city. The stock is offered at $95 and accrued dividends for each $100 share. The dividends are payable every three months. Two plans have been proposed under which the public may acquire stock. One enables the purchaser to secure stock immediately by paying cash. The other provides for time payments of $10 per share at the time of purchase, $10 per share for seven months and $15 per share as final payment. The purchaser has the option of withdrawing all partial payments any time prior to the date of final payment, but in that event the company agrees to pay only 3 per cent on the amounts paid in up to the time of withdrawal.

The Northern Ohio Traction & Light Company comprises 242 miles of track of which 100 miles are city lines in Akron. In addition to its business in Akron the company sells power in twelve adjacent communities. The company states that its stock is backed by the need of service absolutely essential to the life and progress of the community. The company has never passed a preferred dividend.

## Ohio Lines Segregated

### System Centering at Springfield Broken Up Into Constituents to Facilitate Rehabilitation

Interurban and city properties which have heretofore been operated as a part of the Ohio Electric Railway, Springfield, Ohio, have come under separate management. This change resulted from the cancellation on July 18 of the operating agreements then existing. The formal cancellation of leases will follow by court action. Petitions have already been filed toward this end.

As none of the properties has been paying any interest foreclosure action will probably be taken. Following this the proposed reorganization will be worked out. Several of the branches which are not considered desirable in the reorganization proposition will be abandoned and the tracks taken up.

Under the separation proposition, it is planned to place each property upon its own resources. The names of the lines will be changed, it is stated. This will be especially true covering the interurban lines in the Springfield and Dayton district. The original line in this section was known as the Dayton, Springfield & Urbana Railway.

### J. H. McCLURE WILL MANAGE

In this separation of control of interurban and city properties the Indiana, Columbus & Eastern, formerly known as the Dayton, Springfield, Columbus and Lima system, with branches from Dayton to Union City, Ind.; Lima to Defiance and Columbus to Grove City, has come under the actice management of J. H. McClure, receiver. He will move his headquarters from Lima to Springfield.

The Ohio Electric Railway proper, as distinguished from the leased properties, consisting of the interurban line from Lima to Toledo, and the local light and railway properties in Lima, has come under the active management of B. J. Jones, receiver for the Ohio Electric Railway. He will move his headquarters from Springfield to Lima. The Indiana, Columbus & Eastern properties will be operated hereafter from Springfield, and Mr. Jones will direct the other properties from Lima.

The interurban properties known as the Columbus, Newark & Zanesville system, extending from Columbus to Zanesville, with the Buckeye Lake and Zanesville city property and light plant, have come under the active management of B. A. Berry, receiver, of Columbus. Mr. Berry was formerly commissioner of securities of Ohio and was recently placed in charge of these properties. These will be operated substantially as at present, in connection with the Indiana, Columbus & Eastern system.

Day & Zimmerman, operating engineers, of Philadelphia, act as heretofore in an advisory capacity, and will have supervision of the general operations of all the properties. The name of each road will be changed, so as to indicate the extent and character of the separate properties.

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## Savannah Reorganization Plan Out

A plan for the reorganization of the Savannah (Ga.) Electric Company has been presented by Philip Stockton and George J. Baldwin, the committee under a stockholders' agreement of Dec. 26, 1919. It is proposed to organize a new company, which will be known as the Savannah Electric & Power Company, to acquire all of the properties of the Savannah Electric Company and its subsidiaries.

The property is to be conveyed subject to existing mortgages and the bonds issued under these mortgages are to be assumed by the new company. There would be new bonds to the extent of $2,500,000. The stock to be issued would consist of $1,300,000 of debenture stock, series A, 8 per cent cumulative, to be issued to finance the balance of the demand notes and unpaid interest thereon; $1,000,000 of 6 per cent cumulative stock, cumulative after Oct. 1, 1926, to be issued to the present holders of $1,000,000 of 6 per cent preferred stock, share for share, without assessment or other costs; and $2,500,000 of common stock to be issued to the present holders of $2,500,000 of common stock, share for share, without assessment or other costs.

The new first and refunding bonds and the debenture stock are to be issued only to finance obligations which now have priority over the preferred and common stock and to provide for the construction of the new company, so that the equity of the stockholders will in no way be impaired by the plan.

The committee says that the earnings on the basis of the new capitalization are sufficient to pay all charges and dividends upon the new debenture stock and preferred stock with ample margin.

Stone & Webster have been appointed reorganization managers. The time within which the plan may be declared operative is limited to Sept. 30, 1921.

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## $382,065 Profit Earned by P. R. T.

The audit of the board of experts placed on the books of the Philadelphia (Pa.) Rapid Transit Company on behalf of the city has just been completed. It shows that the gross income of the company for the year ended Dec. 31, 1920, was $39,400,341, out of which the company must pay expenses of one kind or another of $39,018,276, leaving a profit of only $382,065.

The revenue from transportation was $39,301,973, to which was added revenues of other operation making a total of $38,807,354 from operation. Deducting operating expenses, leaves a net income of $9,612,189. Adding to this non-operating income gives a total net income of $10,205,175. Rentals for leased lines amounted to $7,366,500, and interest charges, ground rents, amortization charges, etc., amounted to $9,823,110, leaving the company a profit of $382,065 for dividend purposes.

The report also gives information concerning the monthly passenger revenues and a statement of the net profit and loss for each of the twelve months, together with pertinent information concerning advances to subsidiary companies during the year.

# Financial News Notes

**Detroit United Bonds Offered.**—Dillon, Read & Company, New York, N. Y., are offering for subscription to yield more than 8 per cent $4,000,000 of first mortgage collateral 8 per cent sinking fund gold bonds of the Detroit (Mich.) United Railway, maturities Aug. 1, 1922, and Aug. 1, 1941. The total authorized issue of these bonds is $5,000,000. They are being put out for refunding purposes.

**North Carolina Property Sold.**—The property, including franchises of the Cumberland Railway & Power Company, Raleigh, N. C., was recently bid in for a committee of bondholders by Herbert L. Jones, president. The public sale took place at Fayetteville on July 2. The price was $75,000. It is reported that the bondholders will continue the road in operation.

**Bond Issue Proposed for Improvements.**—A bill introduced in the City Council of Seattle, Wash., and referred to the city utilities and finance committees provides for the issuance and sale of $1,330,000 of utility railway bonds in order to carry on needed extension and betterment work. The bill provides for the retirement of these bonds in annual payments beginning six years from date and ending twenty years from the date of issuance, with interest thereon at 6 per cent.

**Boston Property Pays Interest.**—The Eastern Massachusetts Street Railway, Boston, Mass., met the interest on its Series A, B and SA mortgage bonds on July 1. The two preceding semi-annual payments due July, 1920, and January, 1921, were deferred due to the poor financial condition of the company, and are still unpaid. However, improvement in conditions made it possible to meet the payments on July 1. It is reported that every district is now earning the cost of service. This favorable condition is attributed mainly to the introduction of one-man safety cars.

# Traffic and Transportation

## City Will Move for Delay

The city of Minneapolis, Minn., proposes in its answer to the petition of the Minneapolis Street Railway before the Minnesota Railroad & Warehouse Commission to move for delay in that the city is not prepared to make the contest. Objection will be made to jurisdiction over electric railway fares, on the ground that the law is unconstitutional.

At the hearing of July 15 in the Duluth Street Railway request for an increase in fare for emergency purposes from 5 to 7 cents, J. B. Richards, city attorney, held that no emergency exists and that any change in fare should await the valuation of the company property. The company replied that it is losing money. The Council has rescinded a resolution calling for $350,000 expenditure for maintenance and $300,000 for extensions and improvements. A decision is expected by July 30.

The city planning board of St. Paul is making a survey of all lines of the City Railway to determine whether all districts are being served adequately and continuously.

## Court Orders Fare Cut in Cincinnati

In a decision handed down by Judge Frank R. Gusweiler, the Cincinnati (Ohio) Traction Company has been ordered to reduce fares one-half a cent to 8 cents on Aug. 1, and to advertise such and to post notice of the reduction in the cars. The company also has been ordered to prescribe rules for carrying into effect the provision of the ordinance reducing the rate of fare for school children to 5 cents.

The validity of the ordinance passed by the City Council in amending the service-at-cost franchise was established by the court in reviewing the case. Judge Gusweiler held that inasmuch as the amended ordinance had been accepted by the company it took the form of a contract binding on both parties. He declared that under the state laws and under the United States Constitution this contract could not be altered or modified by the initiative and referendum section of the state constitution adopted in 1912.

Judge Gusweiler said that the ordinance reducing fares seeks to modify both a previous ordinance and the resolution of the Board of Administration adopted in 1896, the days before the referendum. He states that the city gives the company a consideration by providing that the company shall not be authorized or required to pay into the reserve fund any sum in addition to the initial payment of $250,000 now in the fund. The court concludes by stating that the city of Cincinnati is entitled to specific performance of the contract, and therefore orders the company to carry out the provisions of the ordinance.

The citizens' committee, which presented a petition for the referendum, stated that it would probably take some further action in the case.

## Emergency Bus Line in Legal Tangle

An order to show cause why an injunction should not be issued against the operation of motor buses on the Grand Concourse, details of which are given in the ELECTRIC RAILWAY JOURNAL, July 16, 1921, was served on July 15, on Commissioner Grover Whalen of the Department of Plants and Structures of New York City under whose direction the buses are being operated.

Suit was instituted by Jennie T. Quinn, represented by Alfred T. Davidson, of 2396 Third Avenue. Affidavits supporting the action were signed by Edward A. Maher, Jr., and Leslie Southerland, president and vice-president of the Third Avenue Railway. Several employees of the company also filed affidavits.

Mr. Whalen said the suit was instituted to put all municipal buses out of commission. If the application should prevail, it would affect every bus line now in operation in the city and would compel people to walk along all the routes abandoned by the electric railways.

## Eight-Cent Rate to Continue Indefinitely

By a recent ruling of the State Railway Commission of Nebraska the Lincoln Traction Company will continue indefinitely its 8-cent cash fare. The schedule of rates is 8 cents cash with four tokens for 30 cents within the Lincoln zone. Between outlying points and the city the fare is 10 cents. School children are transported for 5 cents. The company has been operating under a temporary ruling since December, 1920, and this schedule expired on June 30, 1921.

## London General Omnibus Plans New Services

According to *Motor Transport* for July, 1921, the London General Omnibus Company plans to open up large country services in the outer circles of Greater London. These new routes will provide facilities between points hitherto without direct means of communication. The routes are through somewhat hilly districts. In consequence a considerable number of single-deck buses of the K type, especially designed for these services, are in course of construction. The new vehicles will each seat thirty-four passengers. They are expected to overcome the difficulties which have risen in certain localities, where the existence of bridges over railways of insufficient strength to take the ordinary type of bus, has caused considerable inconvenience.

## Case to High Court

### Lower Court at Louisville Seeks Answers on Questions of Law from Supreme Court

The Louisville Railway case has been passed by the United States Circuit Court of Appeals to the Supreme Court of the United States. That, in brief, is its decision regarding the appeal of the city of Louisville from the decision of Judge Evans barring interference with the collection of a 7-cent fare by the company.

Holding the case is one which the Circuit Court should not decide, Judge L. E. Knappen announced from the bench that the court would reserve decision until it had certified certain questions of law to the Supreme Court. What these questions are was not made public.

These questions are expected to reach the Supreme Court in time for the October term. In the meantime, the company may continue to collect the 7-cent fare by authority of Judge Evans' injunction.

In the opinion of Churchill Humphrey, attorney for the company, one of the questions that has been passed to the higher court is the construction of Section 3 of the Bill of Rights of the Kentucky Constitution, which says in effect that no corporate franchise shall be granted unless such be subject to alteration, amendment or revocation.

The Supreme Court, it was said, may merely answer the questions certified to it by the Court of Appeals, or it may order sent to it for its perusal the records of the entire case. In the first event, the answers would come back to the Circuit Court, which would then hand down a decision. In the latter case, the decision would probably come down from the higher court.

The city contends, according to counsel, that the franchise, contracts and agreements calling for a 5-cent fare are binding and continuing in force, while the company's contention is that the contracts are purely regulatory and subject to change.

Company officials estimate that if there had been a decision favorable to the city, it would have to refund on rebate slips a maximum of $142,000. It estimates that it has sold 12,000 strips of tickets a day since March 24. This would mean a refund of $1,200 a day for 119 days. The company believes, however, that not more than 50 per cent or 60 per cent of the rebate slips have been saved. The company collected a 7-cent fare forty-one days without issuing receipts.

## Commission Will Hear Arguments

The California State Railroad Commission set July 26 as the date for hearing arguments of the Los Angeles Railway in support of its application for a rehearing of the rate case which has been before the regulatory body for a long time. The commission recently handed down a decision establishing a 6-cent cash fare, but specified that tokens be sold ten for 50 cents, thus retaining the 5-cent fare for regular riders.

The commission in its decision estimated that one-third of the riders would pay 6 cents cash fare. In the application for a rehearing, the railway contends that this estimate is too high and declares that 20 per cent would be a hopeful estimate.

The valuation of the company's property used in establishing the base rate of profit is as of June 30, 1920. The company contends that improvements made since that time have increased the valuation about $5,000,000.

## Auto Transportation Act Interpreted

In an order granting certificates of necessity and convenience to both the Barker Motor Company and the firm of Porter & Richards for the operation of auto stages between Everett, Stanwood and Mount Vernon, the State Department of Public Works of Washington makes its initial announcement of regulative principles adopted in relation to auto transportation under the laws of 1921, so far as they are involved in the case decided. Both companies were operating over the routes described on Jan. 15, 1921, by which they are automatically entitled to certificates under the act, if operating in good faith.

Protest against the good faith qualification for exclusive rights on the route was made on behalf of the Seattle, Everett and Vernon Stage Lines Company, on the ground that the two operating companies had not complied with the jitney bond requirement of 1915, for the privilege of entering and leaving stations within the limits of cities of the first class. As the attorney-general has held prior compliance with the municipal jitney bond requirement to be a condition of good faith upon stage companies entering first-class cities, it is expected that the department's decision to disregard the requirement as to lines established before the present certificate of necessity act became effective will be the basis of litigation on the part of contesting stage lines. On this point, the Department of Public Works, in its ruling on the Everett-Mount Vernon contest, says:

> We are not inclined to hold that failure to procure a bond under the law prior to Jan. 15, 1921, must necessarily taint the operator with bad faith and preclude the issuance of a certificate under Chapter 3 of the session laws of 1921. There is such a diversity of opinion even among lawyers as to whether the requirements of Chapter 57 of the 1915 laws apply to stage companies which merely enter city limits for the purpose of receiving and discharging passengers, it would seem harsh to hold that every such operator who failed to procure a bond was necessarily acting in bad faith. We hardly believe a layman should be penalized for failure to comply with statutory provisions when lawyers of standing and ability doubt the application of the law to his case.
>
> A wilful and inexcusable violation of the plain statute or ordinance affecting the operation would present a different question.

This latter conclusion is as near as the department undertakes an expression as to whether failure of stage companies to comply with the jitney bond law on routes entering first-class cities will be accepted by the department as a lack of good faith.

## Motor Vehicles Must Pay in Illinois

An amendment to the motor vehicle law of Illinois, made effective July 1, 1921, provides that "all vehicles, trailers and semi-trailers used for carrying freight, when used for hire, operating regularly over fixed or definite routes between two or more municipalities, or from a point or points outside of municipalities into a municipality over improved state highways, and with fixed schedules or rates, shall pay an additional license fee of ½ cent per mile . . . for the total mileage traveled over such improved state highways by each vehicle, trailer or semi-trailer in each calendar month."

Furthermore, all similar vehicles used for carrying passengers, when used for hire, and operating regularly on fixed routes over improved state highways, and with fixed rates, must pay "an additional license fee of one-twentieth of 1c. per mile for each passenger seat, multiplied by the total number of miles traveled by such vehicle over the improved highways."

The new public utilities act also provides that no person shall operate any motor vehicle for the carriage of passengers for hire, or for the carriage of freight for hire, unless he shall file with the commission a sworn statement of his ability to pay all damages which may result from any accidents due to the negligent use of the vehicle, or file with the commission security or bond guaranteeing the payment. In case one person operates two or more motor vehicles, he must file proof of his ability to pay damages, or provide a bond, and carry insurance against damages, to the amount of $10,000 for each motor vehicle.

## Maps Prepared to Guide Trainmen

Maps of all lines showing danger points are being prepared by the Los Angeles (Cal.) Railway for the use of trainmen. The maps will indicate fire stations, garage entrances, busy curves and intersections, schools, grades and other points of risk. This plan follows the successful use of line transfer maps which were furnished trainmen when the new coupon transfer was introduced May 1. These maps showed the routes of lines on separate sheets with a red line indicating "in" trip and a blue line showing "out" trip.

## Injunction Refused to Connectic Jitney Men

Judge Keeler of the Superior Cou for New Haven County has refused t grant a temporary injunction to the ji ney men to restrain the prosecuting of cers and chiefs of police in New Have and Derby from referring complaint and making arrests under the new ac regulating buses in that state. The ac was attacked for its unconstitutionalit on various grounds.

### ALL OBJECTIONS DISMISSED

The court dismisses all nine of th objections cited. It holds the new la to be a legitimate exercise of the polic power by the General Assembly wit reference to a business peculiarly af fected by a public interest with ampl provision by way of review to insure t any one concern due process of law whereby his constitutional rights may be safeguarded. In disposing of the objection that the legislation takes the plaintiff's property without due process of law, the court holds that clearly no tangible or visible property of the plaintiff was so taken. It says that prior to the enactment of the statute jitney proprietors clearly enjoyed nothing properly called a franchise. They merely followed a calling subject to some degree of special regulation of law. The court further holds as lacking merit the two grounds of objection that the act grants special privileges to certain clases of persons and that it deprives the plaintiff of equal protection of the law. The court held that these objections in effect presented the same questions. The ruling of the court was that an electric street railway had to obtain a certificate of convenience and necessity similar to that acquired by the bus owners to operate.

### JITNEY OPERATORS ARRESTED

On orders of City Attorney Sheridan Whitaker of New Haven all jitney drivers on the streets after noon of July 23 were arrested charged with violations of the state jitney law. Even those jitneys which bore "Free Bus" signs were ordered arrested.

Attorneys for the jitney men on July 25 went before the City Court and asked to try but one of those arrested, the others to share alike in the ultimate result. The next step was to plead not guilty and the attorneys filed a demurrer, which the court was asked to overrule so the case could be taken to the Court of Common Pleas, which convenes the first Monday in August. It is planned to follow the same procedure in that court so as to be able to take an appeal to the Supreme Court as soon as possible.

A move to take the case to the Federal court is also going forward. The plan is to move for the fixing of a date for a hearing on an injunction, making the jitney men the plaintiffs and the State of Connecticut the defendant on the ground that it is depriving some of its citizens of private property and their livelihood.

## Trolley Bus Installation Proposed at Akron

The officials of the Northern Ohio Traction & Light Company, Akron, Ohio, have agreed to install at least one trolley bus on the West Exchange Street extension as soon as one of the new vehicles is available. The announcement follows a series of conferences between City Councilman Joseph O'Neill and the traction officials. The city councilman proposed to use the new trolley bus on all city car line extensions so as to eliminate the necessity of laying track.

Advocates of the extensions would have the city sell bonds for the purchase of the trolley buses, the principal and interest of which would be guaranteed by the railway. This would give the city a hold on the company in case the municipality should decide to purchase the lines when the present franchises expire in 1924. City officials estimate at present 20 miles of extensions are needed. Trolley buses could perform this service on an investment of $350,000, it is said.

The traction officials estimate the cost of overhead wires and poles necessary for trolley bus operation would average from $4,500 to $7,500 a mile. Railway engineers estimate the cost of track to run from $45,000 to $60,000 a mile. Trolley buses are estimated at $9,000 each. The adoption of the trolley bus will permit the extension of many car lines which under the traction company's present financial status would be impossible.

This is the fourth city in the United States so far which has adopted the trolley bus as an auxiliary to street railway systems. Other cities in their order named are Richmond, New York and Buffalo.

## Salt Lake & Utah Granted Fare Increase

The Public Utilities Commission of Utah has issued an order granting increases in fare on the Salt Lake & Utah Railroad, Salt Lake City, Utah, also known as the "Orem line." One-way tickets are to be increased 20 per cent. Round-trip tickets, for which a 20 per cent increase was asked, are permitted to be increased 1.8 per cent of one-way fare. One thousand-mile books are increased from 2¼ cents to 2½ cents a mile. No increase in 500-mile books, commutation tickets or school tickets is allowed.

The application of the railroad company was for authority to increase passenger rates and excess baggage rates in all 20 per cent. The company set up a book value on the property to support the application. The commission stated that it found the income statement indicated so clearly the need for additional revenue that it felt it unnecessary to await the actual physical valuation of the property, it being apparent that the book values showed that the company's revenues were not sufficient. The commission stated that the company had not up to the present been able to set up a depreciation reserve on its property as a whole. The only class of property that had been depreciated was rolling stock and shop equipment.

## Eight-Cent Fare Decreased Traffic Slightly

Notwithstanding the fact that fares have been increased from 5 cents to 8 cents in Portland, Ore., within the past three years, the number of passengers increased the first two years, with a slight falling off in traffic when the 8-cent fare went into effect. The figures are as follows:

| Year | Rate | Fares Collected |
|---|---|---|
| 1917 | 5-cent fare........ | 60,611,072 |
| 1918 | 6-cent fare........ | 68,628,602 |
| 1919 | 6-cent fare........ | 73,960,478 |
| 1920 | 6-cent fare to June 15 and 8-cent thereafter ............. | 71,175,872 |

## Transportation News Notes

**Operator's Name Posted.**—The Trenton & Mercer County Traction Company, Trenton, N. J., has adopted the plan of posting the name of the operator of the car above his head so that passengers may become acquainted with him. The card reads: "The operator of this car is ——— ———."

**New Fare in Effect.**—The City Light & Traction Company, Sedalia, Mo., recently put into effect a 6-cent fare for purchasers of tickets and 10 cents for a cash rate. Children may ride for half fare. In promulgating the new schedule the company considered the protection of its regular patrons who by buying tickets will pay the usual rate, 6 cents.

**Eight Cents in Montgomery.**—By a recent ruling of the Public Service Commission the Montgomery (Ala.) Railway, Light & Power Company has been authorized to put an 8-cent cash fare into effect. Ticket buyers will continue to pay the rate which has been in effect many months. The company through its receiver, Ray Rushton, applied to the commission several months ago for a 10-cent fare.

**Safety Cars Allowed in Los Angeles.**—The Los Angeles (Cal.) Chamber of Commerce has passed a resolution indorsing the continued use of one-man safety cars in Los Angeles "on the grounds that they greatly reduce accidents and practically eliminate those accidents entailing injury." The organization also recommended continued use of the cars to demonstrate more clearly their accident prevention features.

**Lower and Higher Fares in Effect.**—The Lordship Railway, Bridgeport, Conn., recently announced a reduction in fares from 6 cents to 5 cents from Hollister Avenue to Lordship Beach. However, the trip from Golden Hill Street to the beach will cost 10 cents in place of the former 6 cents. The railway, which has charged a 6-cent rate for the past two years, was instrumental in developing Lordship Beach.

**More Trains to Improve Service.**—A revision in the schedule of trains on the Interstate Public Service Company's traction line between Indianapolis and Louisville, whereby the service on the line will be improved and more trains operated, became effective June 15. According to the new schedule, one new limited interurban will be operated each way daily between Indianapolis and Louisville and changes will be made in the number of local trains.

**Hearing Scheduled on Indianapolis Fares.**—A hearing on rates of fare to be charged by the Indianapolis (Ind.) Street Railway on expiration of the sixty-day test period of 5-cent fare and 2-cent transfers, July 31, will be held by the Public Service Commission. Officials of the railway are expected to put before the commission the losses occasioned by jitney bus competition, which are said to average more than $1,000 daily, and on which the City Council has delayed taking action pending further developments.

**Reducing Fares to Gain Patronage.**—The Minneapolis, Northfield & Southern Railway, operating from Minneapolis to Northfield and Faribault, Minn., has tried to spur up its business by ordering a reduction in fares from 3.6 to 2.5 cents per mile. When the road operated before the war on a low price basis it did a large volume of business. The reduction is made possible by the return of this class of intrastate carrier to the jurisdiction of the State Railroad & Warehouse Commission. The Minnesota fare is legally 2 cents per mile.

**Safety Committees Hold Meeting.**—The June get-together meeting in honor of the Safety Committees of the Union Traction Company of Indiana was held in Anderson on June 6. Besides the usual frivolity which goes with the "great-great-greatest banquet" there were some serious talks by H. A. Nicholl, general manager of the company, and Ross Luellen, safety engineer. Mr. Nicholl reviewed the financial condition of the company, pointing out that the people who have stock in it have not received a penny dividend since 1912. He further stated that no extensive downward revision of wages had been made and that it was the company's intention to maintain the present scale of wages as long as conditions made it possible. He urged strict economy by every employee. Mr. Luellen, safety engineer, brought out the fact that some excellent no-accident records are being made and that a saving of power which means about $40,000 a year to the company is being accomplished. Other speakers were John W. McCardle, chairman of the Public Service Commission of Indiana, who was the guest of honor, and John F. McClure of Anderson.

# Legal Notes

CONNECTICUT—*Injury to Person at Waiting Station.*

A motorman operating a car in a country district was not guilty of wanton misconduct in running down and killing an intending passenger, who was standing 2 ft. from the track, signaling the car, and was struck by the overhang of the steps, for the motorman was entitled to anticipate, for a time at least, that the person killed would withdraw from the danger point. A person waiting at a station is in a different situation from the traveler upon a highway crossing. [Pond vs. Connecticut Company, 111 Atlantic Rep., 621.]

ILLINOIS—*Ordinance of Park Commissioners Granting Rights to Bus Company Held Not Invalid as Occupation License.*

Though a municipality has no inherent power to license any occupation or require the payment of a tax for engaging in it, it has power to impose such conditions for the grant of the use of its streets as it may deem for the best interests of the public, and for such purpose may require a contribution from a public service company, as a motor bus company, and it cannot be held that an ordinance of park commissioners granting to a motor bus company the right to use certain streets, etc., and exacting certain contributions therefor, was an occupation license or passed for revenue purposes, and therefore invalid. [People ex rel. Hoyne, State's Atty., vs. Chicago Motor Bus Co., 129 Northeastern Rep., 114.]

MASSACHUSETTS—*Intending Passenger Hit by Car Overhang on Curve.*

Where it was obvious to an intending passenger that a car would not stop at the usual point on account of a pile of paving stones, the motorman need not warn the passenger that the car would not stop and that she might be struck by the rear overhang of the car. [Fairbanks vs. Boston Elevated Railway, 129 Northeastern Rep., 367.]

MICHIGAN — *Franchise Is Construed Strictly.*

A franchise given to an interurban line with the provision that passengers for a certain fare were entitled to a continuous ride from the township "to Genessee Avenue, in Saginaw," was held to require transportation only to the junction on Genessee Avenue and not along that avenue after it was reached. [Zilwaukee Township vs. Saginaw-Bay City Railway, 181 Northwestern Rep., 37.]

NEW YORK—*Injury to Employee While Riding on a Pass on His Way to Work Held to Be Within Compensation Law.*

Where an employee of a railway company, furnished with a pass entitling him to ride whenever he chose, was injured in a collision when aboard a train on his way to work, the remedy is not in an action at law, but under the Workmen's Compensation Law, since the injury arose in the course of his employment. [Tallon vs. Interborough Rapid Transit Co., 184 New York Supp., 588.]

NEW YORK—*A Street Railway Can Be Compelled to Raise Its Tracks to Meet Changes in the Street Grade, Though Not Ordered to Do So by Public Service Commission.*

Despite Laws 1880, Chap. 511, the Belt Line Railway Corporation, occupying Fifty-ninth Street in the City of New York can be compelled to raise one of its tracks to meet changes in the contour of the surface caused by repaving, though not ordered to do so by the Public Service Commission. [People ex rel. City of New York vs. Belt Line Railway Corporation, 129 Northeastern Rep., 217.]

NEW YORK—*Pedestrian Crossing Street Held Guilty of Contributory Negligence.*

A pedestrian who before starting to cross a street saw a car more than a block away rapidly approaching, and when he had crossed the first track saw that the car was approximately 29 ft. away, but thinking that he could get across proceeded without increasing his speed and was struck, is guilty of negligence as a matter of law, for he was as much obligated to look out for his safety as was the motorman. [McGuire vs. New York Railways, 128 Northeastern Rep., 905.]

NEW YORK—*Sleighs Need Not Carry Lights.*

A sleigh is not a "vehicle on wheels," within the meaning of Highway Law sec. 329a, providing that every vehicle on wheels shall have attached thereto a light or lights, to be visible from the front and from the rear, etc. [Vadney vs. United Traction Co., 183 New York Supp., 926.]

RHODE ISLAND—*State, Through Commission, Has Authority to Regulate Rates of Public Utilities, Such as Street Railroads.*

The paramount authority of the State to regulate the rates of public utilities, such as street railroads, through the agency of a commission, as the Public Utilities Commission, is well established. [Public Utilities Commission vs. Rhode Island Company, 110 Atlantic Rept., 655.]

WISCONSIN—*Railroad Track Laid Across a Street Is "On" Such Street, Under a Speed Ordinance.*

An ordinance limiting the speed of an interurban electric car upon track on a public street to 15 m.p.h. applies at the crossing to an interurban road which crosses a public street. [Merrill vs. Chicago, No. Shore & Milwaukee R.R., 177 Northwest Rep., 613.]

# New Publications

### Functions of Engineering Station of University of Illinois

By Charles Russ Richards. Circular No. 9 of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

This bulletin gives details of the kinds of service furnished by the experiment station and lists the co-operative investigations now in progress.

### The Engineering Index

Published by the American Society of Mechanical Engineers, New York. 586 pages.

Since 1905 this index has been published annually, up to 1913 by the Engineering Magazine Company, and since that time by the A. S. M. E. Some 700 engineering and allied publications are listed.

### Management Engineering—The Journal of Production

Vol. 1 No. 1. Published by the Ronald Press Company, New York.

This is a new monthly publication designed "to serve those who are responsible for the operation of industry." The leading articles all bear on this subject. An interesting feature is that most of the articles carry at their head their numerical classification according to the Dewey system. This classification is not extended to the editorials.

### Report on Standardization of Petroleum Specifications

Bulletin No. 5. United States Bureau of Mines, Washington, D. C.

This bulletin supersedes Bulletins 1 to 4 inclusive of the committee appointed by direction of the President of the United States to co-operate with the United States Fuel Administrator.

All the specifications contained in the previous bulletins have been revised and co-ordinated, where necessary, and to them have been added several not previously published. Bulletin 5, therefore contains complete specifications for all petroleum products with full descriptions of the methods of testing employed in the government laboratories.

### Pamphlets and Clippings in a Business Library

By Virginia Fairfax. 62 pages; illustrated. *Journal of Electricity and Western Industry*, San Francisco, Cal.

This book is a reprint of a series of articles from the *Journal of Electricity*. The subject matter is the basis of a course of instructions at a library school and is the result of the author's experience in working out a practical method of filing pamphlets and clippings, based on approved principles of library science. The text is divided into five chapters. The points covered are the value of pamphlets and clippings when required for ready reference; the sources and selection of material; the filing equipment needed and the alphabetical subject file.

# Personal Mention

## Messrs. Bundy and Fast Advanced on the Ohio Electric

J. H. McClure, receiver for the Indiana, Columbus & Eastern Traction Company, on July 15 announced the appointment of F. A. Bundy as superintendent of the Lima Division of the Ohio Electric Railway to succeed C. C. Fast, who has been promoted to general superintendent of transportation, with headquarters at Springfield, Ohio. Mr. Fast's jurisdiction will extend over the property of the Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Electric Railway and the Lima-Toledo Division of the Ohio Electric Railway. These changes were necessitated by the resignation of F. J. Moore as general superintendent of transportation at Springfield. Mr. Bundy was formerly master mechanic for the Ohio Electric Railway at Lima.

## "Dan" Smith in the Arena

### Enters Mayoralty Contest in Detroit—Has Expressed Himself in Favor of Municipal Ownership

Daniel W. Smith, well known to the electric railway industry throughout the country because of his connection with the Peter Smith Heater Company of Detroit, has announced his candidacy for the nomination for the mayor of Detroit. While no platform has yet been announced, Mr. Smith has expressed himself as in favor of municipal ownership when operated on economic lines and he is expected to put up a fight in keeping with his record as a soldier. Mr. Smith's hosts of friends in the industry will be interested in learning that he has jumped into the political arena.

Besides the numerous friends Mr. Smith has in the electric railway industry, he also has thousands of friends and admirers in Detroit where he has lived throughout his entire forty-six years. Former service men in Detroit are actively supporting his candidacy, for he has gained their friendship through his numerous activities in looking after the wants of needy veterans. During the Mexican border trouble in 1916 Mr. Smith was brigadier-general of the Michigan National Guard and saw border service in that capacity. In the World War Mr. Smith was commissioned a captain in the Motor Transport Corps.

Born in Detroit, Dan Smith is the son of Peter Smith, the inventor of the well-known heating appliances, and he is in close touch with conditions in the city of which he is a native. He is also vice-president and general manager of the Sattley Coin Counting Machine Company, treasurer of the Liberty Foundry and president of the Daniel W. Smith Company.

Mr. Smith has long been interested in and taken an active part in the various military organizations of the state and of the country. In 1892 he enlisted as a private in Company F, Michigan National Guard. Later he was quartermaster sergeant of Company M, 33rd Michigan Infantry and saw active service in Cuba with that organization. On his return in 1899 he was made second lieutenant, Company C, First Michigan Infantry, and later he was successively captain and adjutant of his regiment. In January, 1914, he was made a major and detailed as adjutant general of the First Brigade, Michigan National Guard. He again saw active service on the Mexican border in 1916. When the United States became involved in the World War he refused a lieutenant-colonelcy because the commission would necessitate his being detailed to Washington in the Department of Purchase and Supplies for the War Department. In order that he might get across he obtained the commission as captain of the Motor Transport Corps and was ordered to France, but the armistice was signed while he was on the seas.

DANIEL W. SMITH

Among the various organizations of which Mr. Smith is a member are: United Spanish War Veterans; American Legion; Veterans of Foreign Wars of the United States; Military Order of the World War; Military Order of Foreign Wars; Detroit Athletic Club; Detroit Boat Club; Detroit Yacht Club; Old Club at St. Clair Flats; Lochmoor Club, and Hunt Club.

Campaign headquarters are being arranged in the Barber Building on the Campus Martius and Monroe Avenue. The campaign is to be conducted purely upon lines of efficiency and economy in city government. His candidacy is bound to appeal to progressive citizens, from whom he expects support.

## Mr. Goff Mediator Again

### Cleveland Banker and Railway Man Named for Difficult Post by President Harding

F. H. Goff, Cleveland, appears again in the rôle of the great pacificator. He has just been designated by President Harding as an official go-between to promote a settlement of outstanding railroad claims against the government. Mr. Goff is president of the Cleveland Trust Company, a director of the Baltimore & Ohio Railroad and a vice-president of the Lake Shore Electric Railway, Cleveland, Ohio.

It might almost be said that to Mr. Goff these positions are an incident. They are when the opportunity arises for him to serve in a public capacity where large interests are at stake. Men like Mr. Goff can make money any time anywhere. Years back during the stormy session at the conferences between Mayor Tom L. Johnson of Cleveland and the late President Andrews of the Cleveland Railway, at which the present service-at-cost plans were laid, Mr. Goff assumed what appeared then to be the suicidal rôle of buffer. He did it at the instance of the late Judge Tayler, after whom the Cleveland franchise grant is named, and he succeeded in accomplishing the seemingly impossible. This was perhaps the first time that he came prominently before the public. He was then a member of the law firm of Estep, Dickey, Carr & Goff.

Those were the days when Mr. Johnson was holding out for a value of $18,000,000 for the Cleveland Railway lines, the railway was contending for an allowance of $30,000,000 and Peter Witt, the same Peter who later originated the end-entrance center-exit car which bears his name and who now attends the railway conventions, took an active part in all the negotiations.

Peter was, so to speak, the *enfant terrible* of the proceedings. Into them Mr. Goff was precipitated. After the warring factions at the hearings had tired of hurling names at one another, Mr. Goff would make one of his polite little speeches by way of throwing oil on the troubled waters, with the result that success crowned the efforts of the negotiations.

All this may sound like ancient history, but it fixed the place of Mr. Goff in public service so firmly that his is one of the first names to be mentioned in Ohio whenever a problem arises which calls for the excercise of unusual patience, skill and foresight in reconciling interests that appear to be divergent.

As was said before, the profession of banking may be only an incident to Mr. Goff, but then it is an incident that does preclude him from accepting all the honors that the public seeks to thrust on the man. After all, in his capacity as banker Mr. Goff is really serving the public continuously by conserving the funds of the countless depositors whose funds are entrusted to the institution of which he is the head. And he has done so well in the rôle of banker that the Cleveland Trust Company has become one of the two or three largest financial institutions in that rapidly growing community.

## Lewis H. Lee to Handle Publicity of Atlanta Railway

Lewis H. Lee, of New York, arrived in Atlanta recently to take charge of the public relations department of the Georgia Railway & Power Company, replacing Charles Towne, who has returned to the New York office of the publicity and public relations organization of Ivy L. Lee.

Lewis Lee is a brother of Ivy Lee, whose publicity organization he has been associated with for two years. During that time he handled the public relations work of the Pennsylvania Railroad and the American Association of Railway Executives. Prior to his connection with his brother's concern he was with George L. Dyer, Inc., a New York advertising firm of national repute, of which another brother, J. W. Lee, Jr., has just been made president.

Mr. Lee's going to Atlanta will be a source of great pleasure to the Atlantans who remember him as a youth and to the hundreds of friends of his father, Rev. Dr. Lee, who was one of the foremost figures in the Southern Methodist church. Lewis Lee was a student at the Boys' High School in Atlanta and after his family moved to the Middle West completed his preparatory education and graduated at Dartmouth with the class of 1918. During the war he was a junior lieutenant in the naval flying corps and was awarded the naval cross for sinking a submarine during his service "overseas."

The Lee organization has recently been employed to handle the publicity and public relations angles of the Georgia Railway & Power Company, and it is to superintend the local details of that work that Mr. Lee goes to that city. The organization formed by Ivy Lee is probably the greatest of its kind in the world. Its services have for years been sought by the largest corporations of the country. The public relations of the John D. Rockefeller interests have for some time been in the hands of the concern and many large Eastern corporations and interests are dependent on the widely known organization for counsel in matters of that sort.

## Operating Staff for Boise Company Appointed

The Boise (Idaho) Street Car Company, formerly the Boise Railway Company, which some time ago was sold to S. F. Watts, whose intention it was to improve and restore the property, now has for its operating personnel W. E. Pierce, president; L. H. Cox, first vice-president; J. L. Eberly, treasurer, and F. A. Wingard, general manager and superintendent.

## Frank L. Dame, President

### North American Company Elects an Experienced Operator and Financier as Its Head

Frank L. Dame was elected president and Edwin Gruhl was elected vice-president of the North American Company, New York, at a recent meeting of the board of directors. Vice-president Gruhl has also been appointed general manager. Harrison Williams, who, with Mr. Dame, Clarence Dillon, George T. Miller, and Edward H. Wells, was made a director in June, 1920, is chairman of the board and chairman of the executive committee. The company has had no head with the title of president since the resignation of James D. Mortimer, on Nov. 1, 1920.

Mr. Dame, by training and experience an engineer, is a man who has exerted a very marked influence on utility development through his participation, at first in charge of construction of many properties in the Northwest, then as a manager and finally through his connection with several of the largest utility holding companies.

F. L. DAME

Mr. Dame began his business career in the testing room of the Westinghouse Electric & Manufacturing Company in Pittsburgh. After a very short training his first construction assignment was at Newburgh, N. Y., and in December, 1889, he was sent to Portland, Ore., as the engineer of that office of the Westinghouse Company. A year later financial depression caused the closing of this office, as well as some others, and Mr. Dame entered the public utility operating field as general superintendent of the Vancouver (B. C.) Railway & Light Company. The end of 1891 found him again located in Portland as engineer of the light department of the Northwest Houston Electric Company. In the following two years he was also active in street railway construction and with the replacement of equipment in several Oregon and Washington cities. This was the beginning of an association of twenty-one years with the General Electric Company, during part of which time he was the operating head of various utility properties in the Northwest, including the Seattle Consolidated Street Railway and the Tacoma Railway & Power Company. This period covered reconstruction development, management and financing of various utilities, and also many official connections with corporations not enumerated.

In 1903 Mr. Dame went to Schenectady as engineer for the committee on local companies of the General Electric Company, which was in charge of all public utility properties then controlled by it. In the following year he was also made engineer of the newly formed Electric Securities Corporation, a subsidiary of the General Electric Company. In 1909 he was chosen vice-president of the Electric Bond & Share Company, a position which he relinquished in the latter part of 1912 to take a long-needed rest.

However, in 1913 Mr. Dame again took up active work when he joined the organization of Harrison Williams, New York. Since then he has served as an officer and director of nearly all of the companies in which Harrison Williams has a controlling interest, including the Central States Electric Corporation, of which he is president; the Cleveland Electric Illuminating Company, of which he is vice-president, and the Republic Railway & Light Company.

**Eustace J. Knight** has succeeded Edward J. Doyle as secretary of the American Public Service Company, Chicago. Mr. Knight's former position as assistant secretary of the company has been filled by R. E. McKee. Mr. Knight has also been appointed secretary and assistant treasurer of the Middle West Utilities Company, Chicago, an office which likewise had been held by Mr. Doyle. R. E. McKee has been made assistant secretary and E. K. Davis has been appointed auditor.

**E. R. Butler** has been appointed trainmaster of the southern division of the Interstate Public Service Company railway lines known as the Indianapolis & Louisville Traction Railway, succeeding R. B. Kent, resigned. Mr. Butler entered the employ of the Indianapolis, Columbus & Southern Traction Company as a conductor in 1908, thereafter serving as conductor, motorman and dispatcher. He was appointed trainmaster of the latter company in July, 1919, and on May 1, 1920, was given leave of absence from this company and appointed trainmaster of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, which have since been taken over by the Interstate Public Service Company. In his new position Mr. Butler will have charge of the operation from Seymour, Ind., to Louisville, Ky., including the city and suburban lines in Jeffersonville and New Albany.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Shipments of Cement Now Exceed Production

### Stocks on Hand as of June 30 Above Normal, but Much Less than in Previous Two Months

The approximate production of finished portland cement in the United States during the first half of 1921, according to the Geological Survey, was 42,468,000 bbl. This amount represents about 94 per cent of the quantity made in the corresponding period of 1920.

The year 1921 began with mills producing at a moderate rate and shipments considerably less than production, but month by month both production and shipments of finished cement increased at a rapid rate, shipments exceeding production in May and June. Production in June was slightly greater than in June, 1920, and also a little above the average for that month during the last five years. The shipments in June of more than 10,500,000 bbl. were larger than those of any preceding June.

Stocks of finished portland cement on hand as of June 30, 1921, amounted to 11,150,000 bbl., compared with 10,300,000 bbl. on Jan. 31. The level of surplus stocks reported on June 30 of this year is slightly above normal, though it is less than the April 30 total of 12,600,000 bbl. On June 30, 1920, stocks of cement in the country totaled 9,000,000 bbl., and on Dec. 31, 1920, 8,941,046 bbl.

## Coal Production Below 1920

Statistics of the Geological Survey of the Department of the Interior show that in point of production of soft coal the year up to July 16, 1921, was, in round numbers, 23,000,000 tons behind 1920, 67,000,000 tons behind 1919 and about 91,000,000 tons behind the war years. The average production per working day, which declined from 1,267,000 tons in the week ended July 2 to 1,237,000 tons in the week of July 9, dropped still further to 1,227,000 tons for the week ended July 16. This is a decrease of about 4 per cent in two weeks.

The current rate of production, however, is still far above consumption. Public utilities apparently exhibit no anxiety over their coal needs in the coming winter for they continue to hold off on buying. Meanwhile the margin of surplus cars available is not great, due to the large number of bad-order cars. If even a moderate revival of business takes place this fall, it is stated, the limit of cars available would soon be reached.

Prices of bituminous coal, the spot index of *Coal Age* shows, have remained stationary for the last two weeks and are now fixed at an almost irreducible minimum by production costs.

## Cedar Pole Stocks Are Good

### Producers Expect Good Demand by Next Spring and Are Going Ahead With Production

A survey of the cedar pole market finds generally slack conditions of buying, though by no means a pessimistic outlook on the part of producers. The first half of the year has been pretty quiet in this line, with prospects that the fall will show some improvement. Some producers, however, do not look for an active market before next spring. There is much work being held in abeyance that should result in pole buying, it is stated, and on the expectation that by next spring sales should be brisk pole producers intend to go right ahead and produce a normal quantity this fall and winter.

There have been some inquiries and orders from central stations but up to this time electric railways have shown little or no interest. A large producer of Southern white cedar poles reports that though April and May were quiet months, June sales showed up better. One of the factors cutting demand for cedar poles has been the increased competition from local chestnut poles which make their appeal on the ground of lower cost. Existing high freight rates on pole shipments from the West serve to maintain this advantage but producers are hopeful of relief being afforded there before long.

Competition in the pole market is keen right now, with good stocks held at distribution points and immediate shipments generally made. Prices have not changed since three months ago on Western red cedar poles, at which time a cut of 15 to 22 per cent was made. Northern white cedar poles have not been reduced, it is stated, and in the opinion of a prominent producer are not very likely to be reduced because of their increasing scarcity. Current quotations on Western red cedar poles are as follows: f.o.b. New York, 30-ft. 7-in. top, $9.55; 35-ft. 8-in. top, $16.10; 40-ft. 8-in. top, $19.15, and the same poles f.o.b. Chicago, $8.30; $13.90, and $16.30 respectively.

## Railway Supplies for Japan

A commission merchant from Japan who is in the United States desires to purchase railway supplies. Further information may be had by referring to No. 35,189, Bureau of Foreign and Domestic Commerce, Washington, D. C.

## W. P. Wire Operation at 50 per Cent Capacity

### General Demand Slightly Better With Prompt Shipments and Stocks that Are Still too Large

Central station extensions are not making very noticeable inroads on jobbers', distributers' and manufacturers' stocks of weather-proof wire. There is some central station buying in the Chicago territory, the southeastern states find sales holding up pretty well on Nos. 6, 8, 10 and 12 and the St. Louis district is finding a slightly increased demand for weather-proof wire in sizes Nos. 6 and 8. There some of the jobbers are buying to keep their stocks on an even level. New England reports show a decided change for the better as the number of building permits and of contracts for wiring old houses is increasing favorably, calling for line extensions. New York territory is not noticeable in its purchasing.

Still there has been considerable residence building in the Northwest, southern California, the Intermountain districts, the Southeast, in some parts of the New York territory and in parts of New England, and this should encourage sales of weather-proof for street extensions outside of congested city districts. But electric railway buying and central-station buying as a whole have been so quiet the weather-proof wire mills are running at a rate of about 50 per cent only. Shipments naturally are good and stocks are still too high for mill comfort. Bare copper wire is quoted at 14¼-14½ cents bare at the mill, up-river fine para rubber at 15½ cents, first latex crepe at 14¾ cents and spot cotton in New York at 12 cents.

Weatherproof wire can be purchased at a relatively low rate, about a 15½ cent base ruling for No. 6.

## Paris-Lyons-Mediterranean Company Will Electrify

The Paris-Lyons-Mediterranean Company proposes to electrify all its lines, starting with that from Lyons to Marseilles, which bore a traffic of 14,000,000 tons of freight per kilometer in 1913. This line, according to the "Fortnightly Survey of French Economic Conditions," New York City, compiled by the French commission in the United States, serves both directly and indirectly Modena, Grenoble, St. Etienne, Geneva, Roanne and the lines from Tarascon to Cette and Grenoble to Marseilles. So inadequate are the facilities of this last line at present that much of the traffic has to be diverted via Valence.

The electrification of the Lyons-Marseilles line will require 200,000 kw., of which 150,000 kw. must be supplied by the Alps-Rhône region. The power stations to be built along the Rhône will be able to furnish this power, and plans are being made accordingly. The P. L. M. Company also intends to construct a power plant itself which will be located at Mondargon.

It further proposes to develop the power resources of the Bessorthe River. The upper basin would permit the construction of a reservoir of 15,000,000 cu.m. capacity. The fall of 1,100 m. would make available, once the reservoir is constructed, 10,000 kw., an important portion of the power needed by the company in this neighborhood.

The Government Railway Administration had already electrified a section of line in this region in 1911. In the same year it decided to extend its electrified line another 35 km. from Mure in Dauphiné to Gap in Haute Provence. If the saving in coal on the government's line from Mure to Gap be taken as basis of comparison, the electrification of the P. L. M.'s Lyons-Marseilles line should mean an annual coal saving of 5,000,000 tons.

## $8,161,000 Spent for Electric Locomotives in 1919

### Bureau of Census Production Figures for Certain Materials Used by Traction Companies

In the preliminary statement of the 1920 census of manufacturers with reference to the manufacturing of electrical machinery and apparatus, just issued by the Bureau of the Census, Department of Commerce, several items appear which may be of interest to traction companies. Comparative figures also are given for 1914 and 1909.

| | 1919 | 1914 | 1909 |
|---|---|---|---|
| Electric locomotives | $8,161,000 | $3,721,000 | ........ |
| Railway switches, signals and attachments | 4,467,000 | 6,394,000 | 5,377,843 |
| Insulators | 6,504,000 | —not specified— | |
| Lightning arresters, choke coils, reactors and other protective devices | 2,353,000 | 1,189,000 | 940,171 |
| Pole-line hardware | 9,379,000 | —not specified— | |

## Rails, Ties, Fish Plates. Tie Plates, etc., Increase Over 1919 Figures

In its tables of detailed statistics of rolled iron and steel produced in the United States in 1920, the *Iron Age* has listed a few products of interest to traction companies. There were 2,604,116 gross tons of steel rails produced in 1920, but in 1919 there were 2,203,843 tons produced here. Production of steel railroad ties in 1920 was the highest since 1916, the respective figures for 1916, 1917, 1918, 1919 and 1920 being 34,311 gross tons, 9,103 tons, 6,438 tons, 16,645 tons and 26,310 tons.

Angle splice bars in 1919 were produced to the extent of 111,169 gross tons, steel and iron combined, while in 1920 this figure jumped up to 175,278 tons; tie plates increased from 205,210 tons in 1919 to 263,635 tons in 1920; fish plates in 1919 amounted to 11,850 tons, and in 1920 they came to 16,603 tons; other rail joints in 1919 amounted to 49,854 tons and in 1920 increased to 71,236 tons. The output of spikes, bolts, nuts and similar fastenings is not included.

## Rolling Stock

**The New York, New Haven & Hartford Railroad, New Haven, Conn.,** which placed an order for eight 60-ft. steel motor cars and fourteen trailers of the same type with the Osgood-Bradley Car Company about two months ago, will receive these cars in the fall of 1921, it is stated. The cost of the motor cars is about $70,000 each and the trailers about $35,000 each. The cars are similar to those now in use on the New Haven's electrified division.

## Track and Roadway

**St. Petersburg (Fla.) Municipal Railway** has deferred its construction work. Efforts to sell $65,000 of municipal bonds for the building of two loops to relieve congestion on the downtown divisions have failed. Should further efforts fail citizens have pledged to take the issue at practically par.

**Public Service Railway, Newark, N. J.,** is improving the grade on Haddon Avenue, Camden, for a distance of 1700 ft. and is installing new rails and ties. The company will also lay a new roadbed from Camden to Collingswood.

**Trenton & Mercer County Traction Corporation, Trenton, N. J.,** has been ordered by the City Commission to improve the roadbed on certain streets in Trenton. This will include new tracks on Olden, Hamilton and Pennington Avenues.

**Oklahoma Railway, Oklahoma City, Okla.,** has petitioned the city for a three months' extension in which to complete the laying of tracks between McNabb and Lincoln Parks. The work was to be finished by Dec. 31. The railway's reason for not finishing the work on time appears to be the hardship of construction in the winter and the desire to rebuild other lines in need of repair, including the tracks on Main Street west of Hudson.

**Seattle (Wash.) Municipal Railways,** may be forced to make an extension on Beacon Avenue which will cost about $100,000. The City Council recently voted to add this extension to the eight proposed railway betterments.

**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.,** was recently before the Railroad Commission as a result of the petition of the City Council ordering double tracking of the North Avenue line from Forty-fifth Street to Lisbon Avenue, a distance of about two blocks. The commission at the same time considered the petition of the City Council for an extension of the Thirty-fifth Street line of the company on Center Street between Sherman Boulevard and Fifty-first Street, a distance of about a half a mile. The case was taken under advisement.

## Power Houses, Shops and Buildings

**Pacific Electric Railway, Los Angeles, Cal.,** has abandoned its project of moving its carhouse at Fifth and American Avenues, Long Beach, to the west end terminal of the lines. Mr. Titcomb said that all arrangements had been completed for the transfer until the new city charter was adopted which placed restrictions on the erection of carhouses and installation of switching facilities on and around Morgan Avenue.

## Professional Note

**J. M. Pneuman,** for the past five years commercial engineer in the railway department of the Westinghouse Electric & Manufacturing Company, is now acting as a consultant on equipment maintenance matters. He is giving special attention to equipment maintenance problems, or assisting the management to establish proper maintenance practices, and is taking care of this work on a retainer basis, dividing his time among the several companies in Ohio by which he is at present engaged. Mr. Pneuman is well qualified through long experience to advise in these matters and in more general engineering studies, particularly as applied to the smaller companies. From 1902 to 1906 Mr. Pneuman worked as an inspector on the elevated lines of the Brooklyn Rapid Transit Company and attended night school at Pratt Institute during this time. From 1906 to 1910 he was employed in the factory of the Westinghouse Electric & Manufacturing Company. During the following year he was foreman of maintenance of locomotives at the Stamford, Conn., shops of the New York, New Haven & Hartford Railroad. In 1912 he became master mechanic of the Annapolis Short Line at Annapolis, Md., which was then operated by Allen & Peck, Inc. Leaving this position in 1914, he became chief engineer of the Buffalo, Lockport & Rochester Railway, continuing in this position until he went with the Westinghouse Company again in 1916, this time in the commercial engineering department.

## Trade Notes

**A. F. Zacher** has resigned, effective at once, as district manager of the Buffalo office of the Economy Fuse & Manufacturing Company, Chicago, Ill.

**John D. Nicklis,** manager of the supply department in charge of mill supplies, Manning, Maxwell & Moore, Inc., 119 West Fortieth Street, New York City, has been appointed manager of supplies and purchases in charge of centralized purchasing at the home office.

**Topping Brothers, 122 Chambers Street, New York City,** jobbers of railway track supplies and heavy hardware, have appointed Spencer Reed Company, 1265 Boylston Street, Boston, its representative in the New England territory. Frank F. Spencer for several years represented Joseph T. Ryerson & Son, manufacturers of machine tools, iron and steel products, etc.

**The International Register Company, Chicago, Ill.** through its sales agent, the Electric Service Supplies Company, has leased 112 International portable hand registers to the Third Avenue Railway Company, New York City. These registers are attached to the fare box and used as an additional check on fares. About 250 of them were also placed with the Public Service Railway Company, Newark, N. J., earlier this year, for use on its safety cars.

**Handlon-Buck Manufacturing Company,** St. Louis, Mo., manufacturer and dealer in electric and steam railway supplies, announces the election of new officers at a recent meeting of the board of directors. A. H. Handlon, Jr., formerly vice-president and manager, becomes president and treasurer; E. R. Handlon, secretary, has been made vice-president; E. W. Handlon, formerly vice-president and treasurer, retains the office of vice-president; and R. D. Teasdale has been elected secretary. The death of A. H. Handlon, president of the company, as announced in the June 25 issue, left a vacancy in the executive personnel.

## New Advertising Literature

**Belt Conveyors.**—The Link-Belt Company 910 South Michigan Avenue, Chicago, has issued a new book, No. 215, on belt conveyors in which it describes the "Uniroll" and "Multiroll" idlers. The company has also issued a new steel chain data book, No. 475.

**Water-Cooling Apparatus.** — The Binks Spray Equipment Company, 3114 Carroll Avenue, Chicago is distributing a small circular describing its "Spra-Rite" cooling pond equipment for steam and ammonia condensers.

**Brazing Torch.** — The Production Engineering Corporation, 40 Sudbury Street, Boston, is distributing a circular covering the "Bantam" electric-gas brazing torch, recently developed by the company.

**National Board of Fire Underwriters, 207 East Ohio Street, Chicago** has issued a fifty-two-page booklet on its "Organization, Purpose and Methods." A description of the services rendered, together with the working method of the organization and numerous illustrations of testing methods and the various labels used, are given.

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*"The 'Standard' Brand on your material is an assurance of eventual economy."*

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## Bates One-Piece Steel Poles with Ornamental Lighting

This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units.

The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

The series lighting conductor is run from pole top to pole top eliminating the use of expensive, troublesome underground cable.

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More cars on the line—More money in the till —

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Added protection for the same construction.

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Leakage reduced to minimum.

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Leakage attendant upon atmospheric changes eliminated.

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Not affected by working temperatures.

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Run-down-at-the-heel railway motor equipment can be quickly and economically brought up to first class operating condition by putting it through the shop for re-insulation.

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because of its being so nearly *rot-proof*, insures a long service-life when used

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*SAVES LABOR COSTS FOR RENEWALS and REPLACEMENTS*

—items which sometimes exceed the first cost of the material itself—so, *for true economy's sake,*

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*It is a guarantee of proper grading at the mill in accordance with the scrupulously high standards set by this Association for the protection of its members and their customers.*

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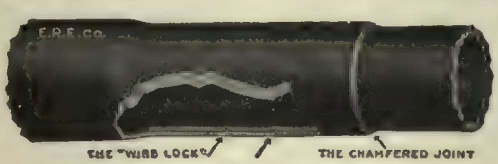

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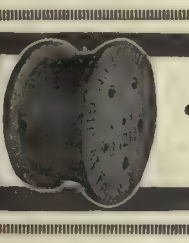

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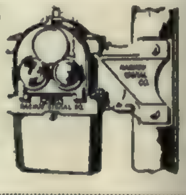

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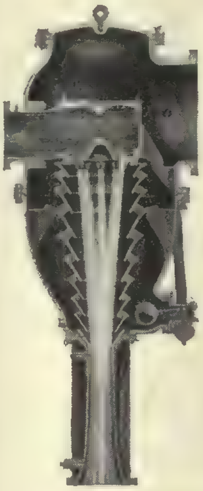

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The Automatic Reclosing Circuit Breaker
KNOWS When to Open and also When to Reclose
AND DOES IT
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"Let's Get Acquainted"

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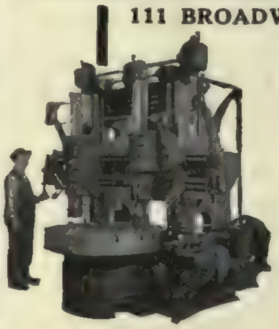

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The Buckeye Jack Mfg. Co.
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is turned out with equal care in our shops. The orders we fill differ only in magnitude: small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
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Circuit Breakers
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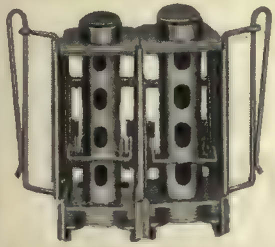

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The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

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Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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Type R-10

Made in various types and sizes to meet the requirements of service on street and city system.

Complete line of registers, counters and car fittings.

Exclusive selling agents for HEEREN ENAMEL BADGES.

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accommodates any rate of cash fare and any kind of ticket, therefore it is not necessary for conductors to take any fares in hand.

**The Cleveland Fare Box Company**
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Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS

*Faster than the ticket seller*

Perey Manufacturing Co., Inc.
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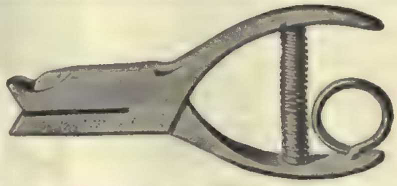

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**Newark, N. J.**

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**Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.**

**The Cooper Heater Company**
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PS HEATERS

**Car Heating and Ventilation**

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. **Write for details.**

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GOLD CAR HEATING & LIGHTING CO.
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**THERMOSTAT CONTROL EQUIPMENTS**

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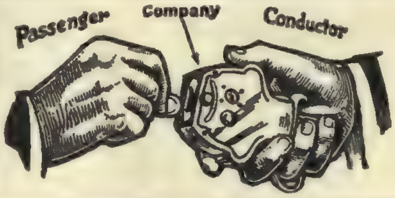

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REMEMBER "RUBIFOAM"? Some years ago "Rubifoam" was in general demand as a tooth and mouth wash. Then came a time when the "Rubifoam" advertisements began to dwindle in the magazines—and, to the group of advertising solicitors who called on the President to ask the reason why, the "old man" made the above statement. For reasons that were good and sufficient, the "Rubifoam" publicity was gradually cut down, then ceased. *Today you recall only with an effort the name of this once widely popular and well-known toilet article.*

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## Keep Advertising in the

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we have been
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Trucks and Motors
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FOR SALE

1—22x42 480 H.P. Bates Corliss Engine direct connected to 325 K.W., 550 Volt D.C., 100 R.P.M. Westinghouse Generator with Switchboard panel.

***Location Mattoon, Ill.***

**CENTRAL ILLINOIS PUBLIC SERVICE COMPANY**
***D. R. Truax Purchasing & Stores Agent***
Springfield, Illinois.

Keep your eye on the Searchlight and your advertisements in it.

**OFFER FOR IMMEDIATE SHIPMENT**

## 500-KW. MOTOR GENERATOR SET

1—500 kw. Westinghouse 550 volt, 833 amp., 514 r.p.m. compound wound dynamo direct connected to—

1—720 hp. Westinghouse 3 phase, 60 cycle, 2300 volt, synchronous motor. Outfit self contained, and complete with starting equipment for A.C. and D.C. ends.

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## DIRECT CONNECTED UNITS

1—1800 hp. Cooper cross-compound engine, size 28 x 60 x 60, speed 80 r.p.m., flywheel 18 ft. 60 ton, direct connected to 1200 kw. G. E. 575 volt generator, 16 pole.
1—1800 hp. Cooper cross-compound engine, size 28 x 60 x 60, speed 80 r.p.m. fly wheel 18 ft. 60 ton, direct connected to 1200 kw. G. E. generator, 16 pole, 575 volt.
2—300 hp. Slater cross-compound engines, size 14 x 28 x 36, speed 120 r.p.m., direct connected to two 250-kw. 550 volt Westinghouse 8 pole direct current generators.
2—300 hp. McIntosh & Seymour tandem-compound engines, size 13 x 23 x 22, speed 200 r.p.m., fly wheel 4 ton, 9 ft. diameter, direct connected to two 220 k.w. Walker generators, 550 volt, 8 pole.
1—500 hp. Hamilton-Corliss Simple engine, size 28 x 36, speed 120 r.p.m. 18 ton, 14 ft. 6 in. fly wheel, direct connected to 400 kw. G.E. 550 volt, 8 pole, direct current generator.
2—1500 hp. Pennsylvania Iron Works, cross-compound engines, size 30 x 48 x 48, speed 80 r.p.m., fly wheel 22 ft., 50 ton, direct connected to 850 kw. G. E. 575 volt, 12 pole, direct current generator.
1—750 hp. Greene cross-compound engine, size 20 x 38 x 48, speed 100 r.p.m., direct connected to 525 kw. G. E. 550 volt, 8 pole direct current generator.
1—700 hp. Pennsylvania Iron Works cross-compound engine, size 22 x 40 x 42, speed 90 r.p.m., direct connected to 500 kw. G. E. 550 volt, 10 pole direct current generator.
1—400 hp. Hamilton-Corliss cross-compound engine, size 16 x 30 x 42, speed 100 r.p.m., direct connected to 325 kw. Westinghouse 600 volt, 8 pole, direct current generator.

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3—231 hp. B. & W. water tube boilers, 108-4 in. x 18 ft. tubes.
1—250 hp. B. & W. water tube boilers, 126-4 in. x 18 ft. tubes.
1—250 hp. Cahall boiler, 126-4 in. x 18 ft. tubes.
4—250 hp. National water tube boilers, 150-4 in. x 16 ft. tubes.
1—350 hp. Cahall water tube boiler, 168-4 in. x 18 ft. tubes.
1—400 hp. B. & W. water tube boiler, 196-4 in. x 18 ft. tubes, B. & W. 75 deg. superheater.
1—600 hp. B. & W. water tube boiler, 294-4 in. x 18 ft. tubes, B. & W. 75 deg. superheater.
1—500 hp. Edgemoor boiler, 248-4 in. x 18 ft. tubes, Foster 75 deg. superheater.
3—115 hp. Kendall horizontal return tubular boiler, 114-3 in. x 18 ft. tubes.
2—150 hp. Kendall horizontal return tubular boilers, 140-3 in. x 16 ft. tubes.
2—150 hp. New England Iron Works Co. horizontal return tubular boilers, 132-3 in. x 16 ft. tubes.
1—600 hp. B. & W. water tube boiler, 294-4 in. x 18 ft. tubes.
1—250 hp. B. & W. water tube boiler, 126-4 in. x 18 ft. tubes.
2—185 hp. B. & W. water tube boilers, 108-4 in. x 16 ft. tubes.
2—500 hp. B. & W. water tube boilers, 252-4 in. x 18 ft. tubes, 80 deg. B. & W. superheater.
1—500 hp. B. & W. water tube boiler, 252-4 in. x 18 ft. tubes, 50 deg. B. & W. superheater.
3—250 hp. B. & W. water tube boilers, 126-4 in. x 18 ft. tubes.
1—125 hp. Hewey horizontal return tubular boiler.

## ENGINES

2—500 hp. Greene tandem-compound engines for belt drive, size 17 x 33 x 48, speed 104, fly wheels 49 in. face by 16 ft. diameter.
3—500 hp. Hamilton-Corliss tandem-compound engines, size 18 x 34 x 48, speed 72 r.p.m., fly wheels 38 in. face, 22 ft. diameter.
One 700 hp. Cooper cross-compound engine, size 20 x 36 x 48, speed 75 r.p.m., flywheel 49 in. face, 20-ft. diameter.
1—300 hp. Harris Simple engine, size 22 x 48, speed 79 r.p.m., belt wheel 32 in. face, 17 ft. diameter.
1—125 hp. McIntosh & Seymour high speed horizontal engine.

## GENERATORS

2—500 kw. G. E. 550 volt, 350 r.p.m., 4 pole, direct current generators.
3—300 kw. G. E. 550 volt, 400 r.p.m., 4 pole, direct current generator.
1—250 kw. Seamens-Halski, 550 volt, 440 r.p.m., 6 pole, direct current generator.
1—Booster Set, 59 hp., 900 r.p.m., 550 volt, motor, direct connected to 55 kw., 4 pole generator, 200 volt boost.
1—250 kw. Westinghouse 500 volt, 420 r.p.m., 4 pole, direct current generator.
2—45 kw. 110 volt, G. E. direct current generators.

## MISCELLANEOUS EQUIPMENT

Various boiler feed pumps, condensers, piping, coal scales and auxiliary equipment used in connection with the above units.

***Supplanted by Purchased Power***

## EASTERN MASSACHUSETTS ST. RY. CO.

**1 BEACON ST., BOSTON, MASS.**

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Anchors, Guy**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Automobiles and Buses**
Brill Co., The J. G.

**Axles**
Bemis Car Truck Co.
St. Louis Car Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Babbitt Metal**
More-Jones Brass & Metal Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Bearings and Bearing Metals**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bearings, Oilless, Graphite, Bronze and Wood**
Bound Brook Oil-less Bearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.
Rail Welding & Bonding C.o

**Bonding Apparatus**
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.
Rail Welding & Bonding Co.

**Bonds, Rail**
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Rail Welding & Bonding Co.
Westinghouse Elec. & Mfg. Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville, Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

**Brooms, Track, Steel or Rattan**
American Rattan & Reed Mfg. Co.
Zelnicker, W. A., Supply Co., Inc.

**Brushes, Carbon**
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.

**Bushings, Graphite and Wooden**
Bound Brook Oil-less Bearing Co.

**Cables (See Wires and Cables)**

**Cambric Tapes, Yellow and Black, Varnished**
Irvington Varnish & Insulator Co.

**Cambric, Yellow and Black, Varnished**
Irvington Varnish & Insulator Co.

**Carbon Brushes (See Brushes, Carbon)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
Differential Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
General Electric Co.

**Castings, Brass, Composition or Copper**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Ackley Brake & Supply Corp.
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Circuit Breakers**
Automatic Reclosing Circuit Breaker Co.
Condit Electrical Mfg. Co.
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coin-Counting Machines**
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Traction Brake Co.

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

**Condensor Papers**
Irvington Varnish & Insulator Co.

**Conduit Fittings**
Chicago Fuse Mfg. Co.

**Connectors, Solderless**
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

**Controller Fingers**
Russell Mfg. Co.

**Controllers or Parts**
Allis-Chalmers Mfg. Co
Columbia M. W. & M. I. Co.
General Electric Co.
Russell Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Electric Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Allison & Co., J. E.

**Conveying and Hoisting Machinery**
Columbia M. W. & M. I. Co.

**Copper Wire**
Anaconda Copper Mining Co.
Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Cross Arms (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals (See Signals, Crossing)**

**Crossings, Frog and Switch**
Wharton, Jr., & Co., Wm.

**Crossings, Track (See Track, Special Work)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

**Cutouts**
Chicago Fuse Mfg. Co.
Johns-Manville, Inc.

**Dealers' Machinery**
Archer & Baldwin
Cleveland Armature Works
Electric Equipment Co.
Foster Co., H. M.
Hyman Michaels Co.
Karasik, Friedman & Co., Inc.
Reading Engineering Co.
Transit Equipt. Co.

**Derailing Devices (See also Track Work)**
Wharton Jr., & Co., Wm.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Inc., Walter A.

**Electrically Operated Switches (Air or Oil)**
Condit Electrical Mfg. Co.

**Electrical Wires and Cables**
American Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Horton, Barker & Wheeler
Jackson, Walter
Kelley, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J. G.

**Engines, Gas, Oil or Steam**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**
Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
National Railway Appliance Co.

**Feed Water Heating**
Schutte & Koerting Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.

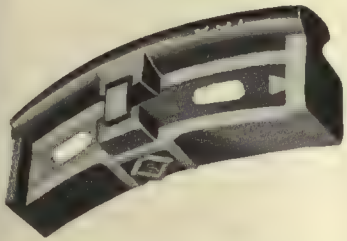
**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.

**Fibre and Fibre Tubing**
Continental Fibre Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.

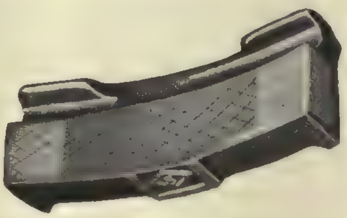
# Brake Shoes

# A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type



**Standard Patterns for SAFETY CAR**



D-67 for Narrow Treads
D-87 for Wide Treads

**American Brake Shoe and Foundry Co.**
**30 Church Street, New York**
**332 So. Michigan Ave., Chicago Chattanooga, Tenn.**

# American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDERED
TRIPLEX

*Send for new Rail Bond book*

**American Steel & Wire Company**
CHICAGO
NEW YORK

# *Budmarsh*

The country of the Afridis, between Asia and Afghanistan, is notoriously *budmarsh,* or wild. Many of the tribal customs are most barbarous, perhaps the worst being that law which authorizes a man to sell his mother and sisters at auction as part of the estate after the death of his father.

The raw ugliness of such an act is not apparent to the Afridi conscience because the awakening touch of Civilization has not yet refined the bare-fanged animal within him; he knows no better and for this reason should be pitied rather than blamed.

A motor brush haphazardly chosen for a specific job cannot give satisfactory results. The operating conditions were there first, and the only way to avoid having brush trouble is to call in an experienced specialist and let him fit the proper brush to the service.

That is the Morganite way.

The man who does not perceive the wisdom of it should be blamed and not pitied, because it is so plainly and logically the only solution of the brush problem.

Why be **budmarsh** when it costs nothing to be sensible?

**Morganite Brush Co., Inc.**

*Main Office and Factory:*
**519 West 38th Street, New York**

DISTRICT ENGINEERS AND AGENTS:

Electric Power Equipment Corp., 13th and Wood Sts., Philadelphia.
Electrical Engineering & Mfg. Co., 909 Penn Ave., Pittsburgh.
R. W. Lillie Corporation. 176 Federal Street, Boston, Mass.
W. R. Hendey Co., Hoge Bldg., Seattle.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1921

Herzog Electric & Engineering Co., 150 Steuart St., San Francisco.
Charles Farnham, I. W. Hellman Bldg., Los Angeles.
Railway & Power Engineering Corporation, Ltd., 131 Eastern Ave., Toronto, Ontario, Canada.

# WHAT AND WHERE TO BUY

**Field Coils (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Fire Extinguishers**
Johns-Manville, Inc.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.
Johns-Manville, Inc.

**Floor Plates**
American Abrasive Metals Co.

**Forgings**
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track (See Track Work)**

**Funnel Castings**
Wharton, Jr., & Co., Wm.

**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

**Fuses, Refillable**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

**Gages, Oil and Water**
Ohio Brass Co.

**Gaskets**
Johns-Manville, Inc.
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas-Electric Cars**
General Electric Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Gongs (See Bells and Gongs)**

**Graphite**
Morganite Brush Co., Inc.

**Grates, Chain**
Green Eng. Co.

**Greases (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Hacksaws**
Gladium Co., Inc.

**Harps, Trolley**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp. Co.
Electric Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Headlining**
Haskelite Mfg. Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.

**Hose, Bridges**
Ohio Brass Co.

**Hydraulic Machinery**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Hydrogrounds**
Horne Mfg. Co.

**Injectors**
Schutte & Koerting Co.

**Inspection**
Electrical Testing Lab's

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.

**Insulation (See also Paints)**
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.

**Insulation Slot**
Irvington Varnish & Insulator Co.

**Insulators (See also Line Material)**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Flood City Mfg. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
Electric Service Supplies Co.
Hubbard & Co.

**Jacks (See also Cranes, Hoists and Lifts)**
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.

**Joints, Rail**
Rail Joints Co.
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., The J. G.

**Lamp Guards and Fixtures**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent (See also Headlights)**
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
Nichols-Lintern Co.
Ohio Brass Co.

**Lanterns, Classification**
Nichols-Lintern Co.

**Lathe Attachments**
Williams & Co., J. H.

**Lathes, Car Wheel**
Niles-Bement-Pond Co.

**Lightning Protection**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Line Material (See also Brackets, Insulators, Wires, etc.)**
Anderson Mfg. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Johns Manville, Inc.
More-Jones Brass & Metal Co
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Loaders, Wagon, Truck or Car**
Portable Machinery Co.

**Locking Spring Boxes**
Wharton, Jr., & Co., Wm.

**Locomotives, Electric**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

**Lubricants, Oil and Grease**
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

**Machine Tools**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work**
Columbia M. W. & M. I. Co.

**Magnet Wire**
Belden Mfg. Co.

**Manganese Steel Castings**
Wharton, Jr. & Co., Wm.

**Manganese Steel Special Track Work**
Wharton, Jr., & Co., Wm.

**Meters, Car, Watt-Hour**
Economy Electric Devices Co.

**Meters (See Instruments)**
Electric Service Suplies Co.

**Molded Insulations and Parts**
Belden Mfg. Co.

**Money Changers**
Galef, J. L.

**Motormen's Seats**
Brill Co., J. G., The
Electric Service Supplies Co.
Wood Co., Chas. N.

**Motors, Electric**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Motors and Generators, Sets**
General Electric Co.

**Nuts and Bolts**
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

**Oil Burning Equipment**
Schutte & Koerting Co.

**Oil Circuit Breakers**
Condit Electrical Mfg. Co.

**Oils (See Lubricants)**

**Packing**
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.

**Paints and Varnishes for Woodwork**
National Ry. Appliance Co.

**Paving Bricks, Filler & Stretcher**
Nelsonville Brick Co.

**Paving Material**
American Brake Shoe & Fdry. Co.
Nelsonville Brick Co.

**Pickups, Trolley Wire**
Electric Service Supplies Co.
Ohio Brass Co.

**Pinion Pullers**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

**Pinions (See Gears)**

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Pipe**
National Tube Co.

**Pipe Fittings**
Power Specialty Co.
Standard Steel Works Co.
Westinghouse Traction Brake Co.

**Planers (See Machine Tools)**

**Pliers, Insulated**
Electric Service Supplies Co.

**Pole Reinforcing**
Hubbard & Co.

**Poles, Metal Street**
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Hubbard & Co.

**Poles, Ties, Post, Piling and Lumber**
Bennett-Field Cross Tie Co.
Duncan Lumber Co.
Southern Cypress Mfg. Assn.

**Poles, Trolley**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Service Suplies Co.
National Tube Co.
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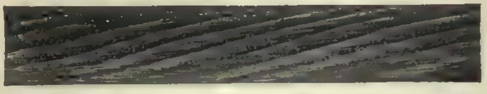

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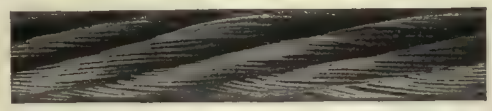

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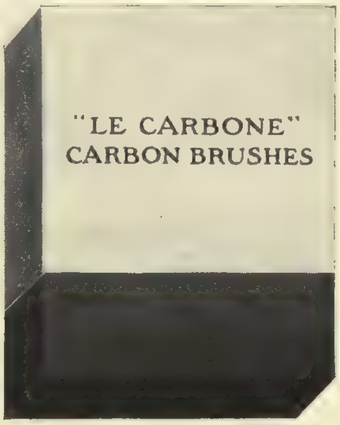

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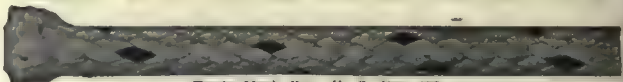

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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Allis-Chalmers Mfg. Co....... 28
Allison & Co., J. E............ 21
American Abrasive Metals Co... 36
Amer. Brake Shoe & Fdry. Co.. 33
American Car Co.............. 41
American Electrical Works..... 25
American Mason S. T. Co....... 38
American Rattan & Reed Mfg. Co.......................... 29
American Steel & Wire Co..... 33
Amer. Steel Foundries......... 38
Anaconda Copper Mining Co... 25
Anderson Mfg. Co., A. & J. M.. 25
Archbold-Brady Co. ........... 26
Archer & Baldwin, Inc......... 31
Arnold Co., The............... 20
Automatic Reclosing Circuit Breaker Co................ 28

B

Babcock & Wilcox Co......... 27
Barbour-Stockwell Co. ........ 27
Bates Expanded Steel Truss Co. 23
Beeler, John A............... 20
Belden Mfg. Co............... 35
Bemis Car Truck Co. ..Front Cover
Bennett-Field Cross Tie Co..... 25
Bonney-Vehslage Tool Co....... 29
Bound Brook Oil-less Bearing Co. 12
Bridgeport Brass Co........... 8
Brill Co., The J. G............ 41
Buckeye Jack Mfg. Co......... 28
Byllesby Eng. & Mfg. Corp..... 20

C

Cambria Steel Co.............. 38
Cameron Electrical Mfg. Co.. 28
Canton Culvert & Silo Co...... 26
Clark & Co. Mgr. Corp., E. W.. 20
Cleveland Fare Box Co........ 29
Collier, Inc., Barron G..Back Cover
Columbia M. W. & M. I. Co.... 40
Consolidated Car Fender Co.... 29
Consolidated Car Heating Co... 29
Continental Fibre Co., The..... 28
Copper Clad Steel Co......... 26
Cooper Heater Co., The....... 29
Cutter Co. .................... 28

D

Page

Day & Zimmermann, Inc...... 21
Differential Steel Car Co., The.. 38
Duncan Lumber Co........... 25

E

Eastern Massachusetts St. Ry. Co. ........................ 31
Electric Equipment Co........ 31
Electric Ry. Improvement Co.. 27
Electric Railway Equipment Co. 25
Electric Service Supplies Co.... 11

F

Feustel, Robt. M............. 20
Flood City Mfg. Co........... 26
Ford, Bacon & Davis.......... 20
Ford Chain Block Co......... 28
"For Sale" Ads............... 31
Fort Pitt Spring & Mfg. Co.... 36

G

Galena-Signal Oil Co.......... 17
General Electric Co.. ......... 18
Gladium Co., Inc.............. 28
Gold Car Heating & Ltg. Co.... 29
Gould, L. E.................. 20
Griffin Wheel Co............. 21

H

Haskelite Mfg. Corp. ......... 21
"Help Wanted" Ads........... 31
Hemphill & Wells............. 20
Holst, Englehardt W.......... 20
Horne Mfg. Co. .............. 29
Hubbard & Co................ 26

I

International Register Co., The. 29
International Steel Tie Co., The. 9
Irvington Varnish & Insulator Co. ........................ 24

J

Page

Jackson, Walter .............. 20
Jeandron, W. J............... 35
Johns-Manville, Inc........... 37
Johnson Fare Box Co.......... 29

K

Kelly, Cooke & Co............ 21
Kuhlman Car Co.............. 41

M

Metal & Thermit Corp........ 25
More-Jones Brass & Metal Co... 35
Morganite Brush Co., Inc...... 33

N

Nachod Signal Co., Inc........ 26
National Brake Co............ 19
National Carbon Co., Inc...... 21
National Pneumatic Co., Inc... 13
National Railway Appliance Co. 35
National Tube Co............ 25
Nelsonville Brick Co.......... 26
New York Switch & Crossing Co. 26
Nichols-Lintern Co. .......... 38
Niles-Bement-Pond Co. ........ 28
Nuttall Co., R. D............. 15

O

Ohio Brass Co................ 7

P

Parsons, Klapp, Brinckerhoff & Douglas .................... 20
Perey Mfg. Co., Inc........... 29
Positions Wanted and Vacant.. 31
Power Specialty Co........... 27

R

Page

Rail Joint Co................. 28
Railway Track-work Co. ....... 6
Railway Utility Co........... 36
Ramapo Iron Works.......... 26
Richey, Albert S............. 20
Roebling's Sons Co., John A... 25
Rooke Automatic Register Co.. 29

S

St. Louis Car Co.............. 23
Samson Cordage Works........ 36
Sanderson & Porter........... 20
Sangster & Matthews......... 21
Scaife & Sons Co., Wm. B..... 27
Schutte & Koerting........... 27
Searchlight Section .........30-31
Silver Lake Co................ 35
Smith & Co., C. E............ 20
Smith Heater Co., Peter....... 29
Standard Steel Works Co...... 22
Southern Cypress Mfg. Assn.... 24
Star Brass Works............ 35
Stone & Webster............. 20
Stucki Co., A................ 38

T

Terry Steam Turbine Co....... 27
Texas Co..................... 14
Tool Steel Gear & Pinion Co.... 16

U

U. S. Electric Signal Co....... 26
Universal Lubricating Co...... 10

W

"Want" Ads ................. 31
Wason Mfg. Co.............. 41
Westinghouse Elec. & Mfg. Co...2-4
Westinghouse Traction Brake Co. 5
Wharton, Jr., & Co., Wm...... 26
White Engineering Corp., The J. G. ................ 20
Williams & Co., J. H.......... 28
Wish Service, The P. Edw..... 38
Wood Co., Chas. N............ 25

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For steel cars—sanitary, fireproof, non-slippery
AMERICAN MASON SAFETY TREAD CO.
Lowell, Mass.
Branch offices in New York and Philadelphia
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BEARINGS
A. STUCKI CO.
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STEEL CAR CO.
H. Fort Flowers, Pres. and Gen. Mgr.
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Indicating Signals
Mechanical Sanders
Ventilators, Smokestacks
Pneumatic Sanders
Selector Switches, Lanterns, etc.
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MIDVALE STEEL AND ORDNANCE COMPANY
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THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
DETECTIVES
*Street Railway Inspection*
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

# If you do business with electric railways

We want to list you in our "Buyers' Guide" to be distributed in connection with the Annual Convention Issue of the Electric Railway Journal.

# If you want proper listings without charge

get in touch with us and learn how to secure adequate representation.

**ELECTRIC RAILWAY JOURNAL, Tenth Ave. at 36th St., NEW YORK**

**AIR BRAKEHANDLES:** Bronze
**AIR BRAKE HANDLES:** Malleable Iron
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- Conductor Signal Bells
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- Malleable Iron, reversing, adj. type
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- Armature Bearing Shells: Semi-Steel
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- Axle Bearing Shells: Semi-Steel
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- Armature Shafts
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**THIRD RAIL SHOE BEAMS.**
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- Journal Brasses
- Journal Check Plates
- Turnbuckles

# *Learn to use THIS SHOP*

## —that's what it's for!

To serve you!

Glance at the list of materials at the left. That's only a partial list of what we do. Anything in metal work that you want—castings, forgings or machine work.

We have large stocks of standard items for prompt shipment, and we are ready to make anything you want according to your own blue prints and specifications.

*Write for our prices on those malleable iron castings you need in converting your old cars to one-man operation.*

**The Columbia Machine Works & Malleable Iron Co.**

**Atlantic Ave. and Chestnut St.**

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**W. McK. White,**
**343 South Dearborn Street,**
**Chicago, Ill.**

**F. F. Bodler,**
**903 Monadnock Bldg.,**
**San Francisco, Cal.**

**Railway & Power Eng. Corpn.,**
**133 Eastern Ave., Toronto, Ont.**

# Birney Safety Cars in Large Cities

In 1919, Brooklyn experimented with a small order of Birney Safety Cars, and immediately recognized their adaptability to conditions in large cities. This resulted in an order for an additional 200 of these light-weight one-man cars, which at that time was the largest single order which had been placed.

The following statements made by W. G. Gove, Superintendent of Equipment, Brooklyn Rapid Transit Company, in reference to these cars before the recent meeting of the New York Electric Railway Association are quite interesting:

> *"The surface lines of the Brooklyn Rapid Transit Company have had 206 standard Birney Safety Cars in operation for a year and a half. These are operated on thirty-five different lines with service varying from shuttle service, where but one car is used, to through lines, where a varying number of cars up to a maximum of twenty-one on a line is used. One of these through lines operates on lower Fulton Street in Brooklyn Borough, which is one of the most congested sections in any city in the country."*

What has occurred in Brooklyn has also been the experience of many others of the largest and most important cities in the United States. In fact, eight (8) of the first ten (10) cities in the country according to population, census of 1920, have installed and successfully operated these light-weight one-man Birney Safety Cars.

"BIRNEY" SAFETY CAR

**THE J. G. BRILL COMPANY**
PHILADELPHIA, PA.

AMERICAN CAR CO. — G.C.KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.

REGARDLESS of the pendulum of prosperity, it is the function of your car card space to return to you a stabilized income year after year.

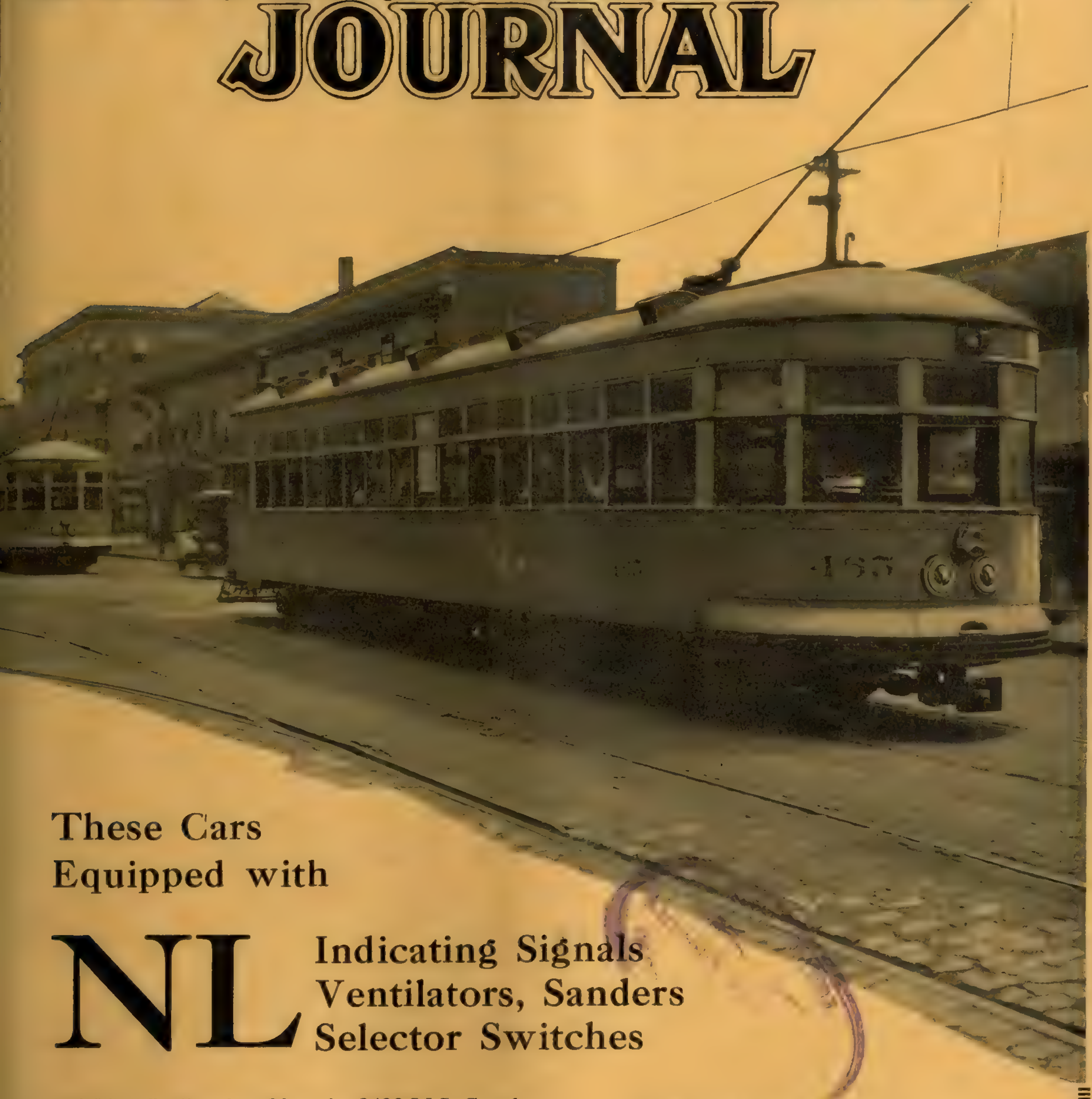
You may accomplish this by placing the responsibility upon an organization which for years has been successfully shouldering this responsibility for large and small electric railway properties the country over.

Collier Service stands ready to insure the income from your car card space over a specified period of time—whether you operate 4 or 4000.

**Barron G. Collier**
INCORPORATED
Candler Bldg., New York

McGraw-Hill Co., Inc. August 6, 1921 Twenty Cents Per Copy

# ELECTRIC RAILWAY JOURNAL



These Cars
Equipped with

**NL** Indicating Signals
Ventilators, Sanders
Selector Switches

550 N-L Indicating Signals, 2400 N-L Sanders specified between January 1st and July 1st.

*Among the cities in which N-L Indicating Signals are now used are:*

Toronto, Ont.
Buffalo, N. Y.
Cleveland, Ohio
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Detroit, Mich.
Akron, Ohio
Knoxville, Tenn.
St. Joseph, Mo.
Alliance, Ohio
Kitchener, Ont.
Philadelphia, Pa.
Terre Haute, Ind.
Youngstown, Ohio

N-L Indicating Signals are accepted as standard equipment by some of the most representative men in the industry.

N-L Mechanical Sanders are economical and desirable for regular operation and *Safe regardless of air conditions.*

N-L Ventilators are Standard on many properties. *Get our prices.*

N-L Selector Switches permit using high wattage lamps, reduces the number of units, *better light, lower lighting costs.*

The Nichols-Lintern Co., 8404 Lorain Ave., Cleveland, Ohio

## *There Are No Substitutes For*

# *Westinghouse Renewal Parts*

*When looked at from a common-sense point of view, it is only reasonable to assume that the manufacturer of railway motor and control equipments is best qualified to make the renewal parts for his particular product.*

*Westinghouse Electric has made it a special branch of its business to provide renewal parts that are exact duplicates of those used in the construction of their apparatus as a whole. The superiority of such renewal parts is manifest.*

*When, after long and severe service, your Westinghouse motor and control equipments require the replacement of worn parts, you can be assured of their continued reliability and efficiency by making the renewals with Westinghouse parts.*

*"A Word To The Wise Is Sufficient"*

***Westinghouse Electric & Manufacturing Company***
***East Pittsburgh, Pa.***

**Westinghouse**

*Vol. 58, No. 6* New York, August 6, 1921 ***Pages* 191-228**

# Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors
HENRY H. NORRIS. Managing-Editor

## *Contents*

### Successful Methods for Cutting Out Waste in the Shop

**Montreal (Que.) Tramways has well-equipped ships which were utilized for war work. Salient principles applied in maintenance practice are minimizing of lifting operations, effective routing of machine jobs and permanent repair of defective parts.............................................Page 193**

### Traffic and Housing in Large Cities

**Dr. Arthur Ertel declares that the connection between the two is close. Local conditions will increase or decrease the annual rides per inhabitant. Definite relation found between track and building development within different areas equidistant from a city center.....................................Page 199**

### The Weekly $1 Pass in Wisconsin Gives Good Results

**Experience in Racine and Kenosha indicates useful field for this method of encouraging off-peak riding. Pass-holders take nearly four rides a day. Walter Jackson declares that simplification of fare collection results from its use. .............................................Page 203**

EDITORIALS ............................ 191
SECURITY SALES TO CUSTOMERS.............. 198
COAL CONSUMPTION BY USERS............... 201
THE IMPERIAL OMNIBUS IN SERVICE.......... 202
LESS THAN 7 PER CENT OF AVERAGE FAMILY INCOME GOES FOR UTILITY SERVICES......... 202
STATISTICS ON POWER GENERATION........... 205
EQUIPMENT AND ITS MAINTENANCE:
- Steam Heating Electric Trains in Switzerland...........206
- New Trolley Transveyor System..........................207
- Removable Unit Type Circuit Breaker....................207
- Car Equipped to Operate Power Plow.....................208
- An Inexpensive Coin Counter............................209
- A New Life Guard.......................................209
- Plan to Reduce the Time and Cost of Air Seasoning Wood...209

WINNING PUBLIC SUPPORT AND CONFIDENCE... 210
NEW ENGLAND CLUB HAS OUTING........... 210
REGULATION OF PUBLIC UTILITIES............ 211
PENNSYLVANIA ELECTRIC ASSOCIATION........ 212
INDUSTRIAL ADVERTISING CONFERENCE........ 212
AMERICAN ASSOCIATION NEWS............... 212
RECENT HAPPENINGS IN GREAT BRITAIN...... 214
NEWS OF THE ELECTRIC RAILWAYS............ 215
FINANCIAL AND CORPORATE.................. 219
TRAFFIC AND TRANSPORTATION............... 222
PERSONAL MENTION........................ 225
MANUFACTURES AND THE MARKETS........... 227

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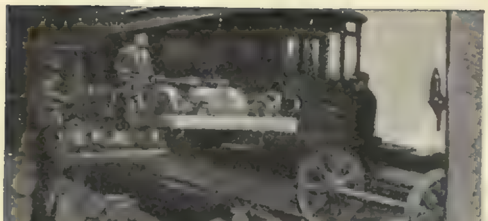

Wherever pneumatic devices are used, as in Car Barns, Repair Shops, Power Plants and for Maintenance of Way

# Westinghouse-National Air Compressors

THE Traction Industry has many important uses for compressed air in connection with "back shop" activities, track work, signal systems, etc.

Westinghouse-National Compressors are designed exclusively for this line of industrial service and various types, depending on local conditions and requirements, have been in operation for years with perfect results in many of the largest and busiest traction terminals in the country.

We supply both stationary and portable motor-driven types which may be equipped either with direct or alternating current motors in various voltages or phases. All capacities up to 550 cu. ft.

Westinghouse-National Compressors are especially noted for their rugged, compact construction (saving floor space), low power consumption, durability, and mechanical features to operate smoothly under all conditions with minimum attention.

**Send for air compressor literature and free engineering advice**

# WESTINGHOUSE TRACTION BRAKE CO.

*General Office and Works, Wilmerding, Pa.*

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BOSTON
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HOUSTON, TEX.
CHICAGO
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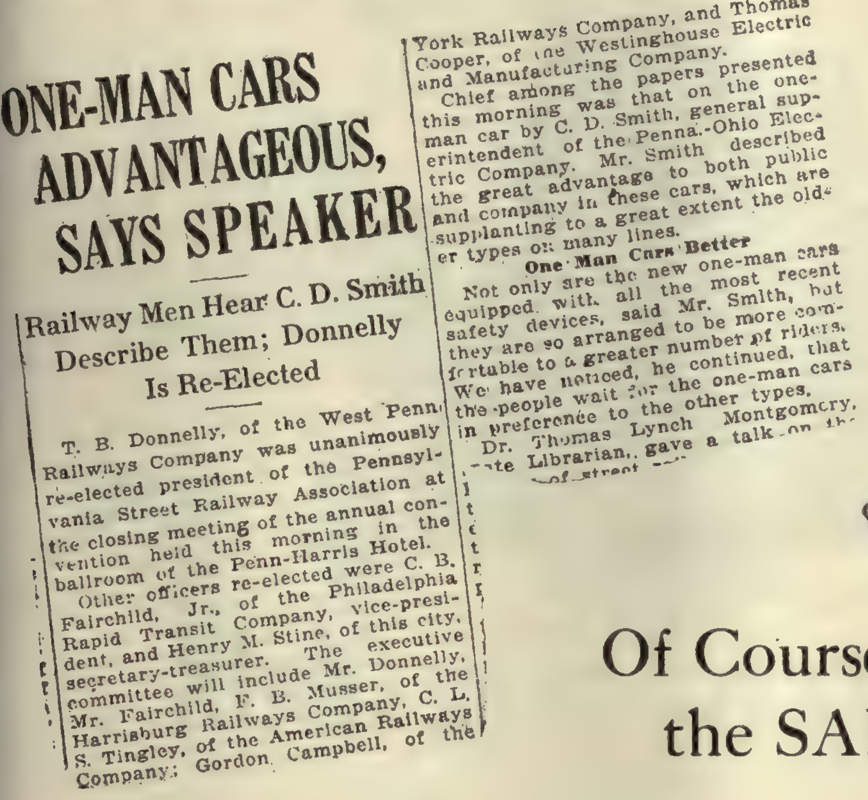
TRADE WA MARK
PITTSBURGH
SAN FRANCISCO
ST. LOUIS, MO.
SEATTLE, WASH.
ST. PAUL, MINN.
LOS ANGELES
SALT LAKE CITY
WASHINGTON

*"In Public Service we must take constant note of the Public Pulse and allow our practices to be influenced largely by Public Opinion."*

# For Comfort



## ONE-MAN CARS ADVANTAGEOUS, SAYS SPEAKER

### Railway Men Hear C. D. Smith Describe Them; Donnelly Is Re-Elected

T. B. Donnelly, of the West Penn Railways Company was unanimously re-elected president of the Pennsylvania Street Railway Association at the closing meeting of the annual convention held this morning in the ballroom of the Penn-Harris Hotel.

Other officers re-elected were C. B. Fairchild, Jr., of the Philadelphia Rapid Transit Company, vice-president, and Henry M. Stine, of this city, secretary-treasurer. The executive committee will include Mr. Donnelly, Mr. Fairchild, F. B. Musser, of the Harrisburg Railways Company, C. L. S. Tingley, of the American Railways Company; Gordon Campbell, of the York Railways Company, and Thomas Cooper, of the Westinghouse Electric and Manufacturing Company.

Chief among the papers presented this morning was that on the one-man car by C. D. Smith, general superintendent of the Penna.-Ohio Electric Company. Mr. Smith described the great advantage to both public and company in these cars, which are supplanting to a great extent the older types on many lines.

**One Man Cars Better**

Not only are the new one-man cars equipped with all the most recent safety devices, said Mr. Smith, but they are so arranged to be more comfortable to a greater number of riders. We have noticed, he continued, that the people wait for the one-man cars in preference to the other types.

Dr. Thomas Lynch Montgomery, ate Librarian, gave a talk on th of street

# Of Course He Refers to the SAFETY CAR

Comfort is a factor to be reckoned with in considering how a greater portion of the Public can be induced to acquire the "car-riding" habit.

Safety Cars, light, open and airy in summer and snugly sealed in winter, built for short stops, quick starts and fast, smooth runs between stations, as well as operating on shorter headways, have given the Public a new standard of comfort and convenience in street railway travel.

The Public has invariably evidenced its appreciation by increased patronage.

Safety Car comfort is mental as well as physical, since the passenger has the pleasant prospect of a ride under conditions that provide a positive safeguard against every contingency.

*It is not a Safety Car unless safeguarded with our standard Air Brake and Safety Car Control Equipment.*

**SAFETY CAR DEVICES CO.**
**OF ST. LOUIS, MO.**
*Postal and Telegraphic Address:*
**WILMERDING, PA.**
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

## —the way to shorten headways on single track lines

# U. S. Electric Signals

The best schedules ever made on paper fall down frequently in actual operation. One car gets delayed, and the whole plan of meetings at turn-outs is disarranged. Then the motorman has to guess where he will meet the next car.

United States Electric Signals eliminate the doubt in the motorman's mind as to whether he can make that next turn-out in time. They do away with those time wasting and dangerous cases of cars meeting on single track, when one must run back again to the nearest turnout.

United States Signals permit the safe use of the maximum capacity of single track lines with turnouts.

## Faster Service With Greater Safety

The extent to which United States Electric Signals have been perfected in technical electric and mechanical details ensures safety and reliability. Every section of single track between turnouts is absolutely protected at all times under any traffic conditions. The first car to reach the trolley contactor sets "the red" against opposing traffic. A car accidentally over-running the contactor against a "red" cannot disarrange the system.

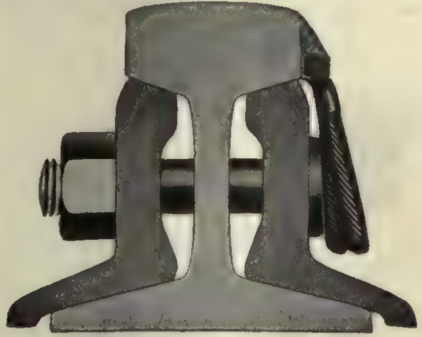
*Tell us your track and schedule problem and we will be glad to show you how U. S. Electric Signals will help solve it.*

### United States Electric Signal Company
**West Newton, Massachusetts**

*Representatives:*

**Western: Frank F. Bodler, Monadnock Bldg., San Francisco**
**Foreign: Forest City Electric Services Supply Co., Salford, England**

# O-B WELDED RAIL BONDS



All O-B Welded Bonds have this beveled shape when the weld is completed.

O-B Type GW—all copper gas weld bond. This was the first commercial welded bond. It is standard on many properties.

O-B Type ST-2—steel terminal gas weld bond. This is the latest development in gas weld bonds.

O-B Type AW3 Arc Weld Bond. Installed with any electric arc welding machine. Best results are obtained when O-B Resistance Arc Welder or Wilson Plastic Arc Welder are used.

## Pioneers that are still in the lead

With a clear field before them, O-B Engineers designed and produced the first commercial welded rail bond six years ago. Each passing year has added proof that the pioneers were right. Today O-B Welded Bonds retain the same fundamentals of design which made them a success from the start.

O-B Bonds of both gas weld and arc weld types have a flat welding surface. The flat shelf is handy for gas welding and essential to arc welding—electric welding is not satisfactory in an angle of less than 90°.

With O-B Bonds the weld is built up in beveled form. This shape gets the greatest strength and the most contact for a given volume of welding metal.

O-B Gas Weld Bonds have a patented means of allowing the gas to escape between bond and rail.

O-B Arc Weld Bonds have a steel welding surface—the easiest electric welding is from steel to steel with steel. Copper sleeves shield the strand, where it joins the terminal, from the intense heat of the arc and protect the cable against vibration.

You pay more for the waste of poor bonding than good bonding costs. O-B Bonds are good bonds. In addition to welded bonds of all types the O-B family includes various designs of stud terminal rail bonds. Prompt shipments. Start saving now.

## THE OHIO BRASS COMPANY, Mansfield, Ohio

New York Philadelphia
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Trolley Materials, Rail Bonds,
Hi-Tension Porc. Insulators,
Electric Car Equipment,
Third Rail Insulators.

1903 NORTHWESTERN PACIFIC 1921

# EIGHTEEN YEARS OF SERVICE

prove the efficiency of *UNION* automatic block signals controlled by continuous A. C. track circuits.

In 1903 the first A. C. track circuits ever installed were put in service on the Northwestern Pacific. They are still giving entire satisfaction.

***"Safety AND Economy"***

Trade Mark

**Union Switch & Signal Co.**

Trade Mark

SWISSVALE, PA.

THE TIE-PLATE IS PART OF THE TIE

TO HELP increase the life of wood ties by preventing rail cutting, many Engineers favor tie-plates.

The principle involved has been extended and developed in STEEL TWIN TIES in which the tie-plate is part of the tie.

The plates provide a larger bearing than is possible with wood ties on two-foot centers. They distribute the wheel loads on top of the concrete of the track foundation instead of at some point six to eight inches below the base of the rail. Hence there is more concrete in bearing with less total concrete required. The ultimate result is better track at a lower first cost.

Steel Twin Tie Track

THE INTERNATIONAL STEEL TIE COMPANY, Cleveland, Ohio

International Steel Twin Ties manufactured and sold in Canada, by Sarnia Bridge Co., Ltd., Sarnia, Ont.

# ELRECO POLES

***For electrification of steam roads as well as improvement of Trolley Roads***

Whether the prospective use be purely utilitarian, as in the overhead electrification of a steam railroad, or the desire to replace the street railway pole line with a more ornamental as well as lasting construction, Elreco Tubular Steel Poles do more than merely answer the purpose.

They lend a certain dignity and charm all their own to their surroundings, which a public wearied by industrial eyesores is not slow to appreciate.

When you add to this consideration the ultimate economy obtainable, you have all the necessary incentive to place your order for Elreco Tubular Steel Poles.

**Electric Railway Equipment Company**
**Cincinnati, Ohio**
**30 Church St., New York**

# Transfer To This Line of Car Accessories

*Probably no other organization can offer such complete service to Electric Railway men.*

Subway or elevated trains—suburban or city cars—safety cars or trackless trolley buses—whatever kind of rolling stock you are operating should be equipped with the most up-to-date safety appliances and the most modern conveniences for your riders and operators. You'll find such on our list.

## KEYSTONE
### Car Specialties

☐ Keystone Air Sanders
☐ Golden Glow Headlights
☐ Illuminated Destination Signs
☐ Keystone Steel Gear Cases
☐ Safety Car Lighting Fixtures
☐ Keystone Motormen's Seats
☐ Faraday Car Signals
☐ Keystone Trolley Catchers
☐ Shelby Trolley Poles
☐ Samson Cordage
☐ International Fare Registers
☐ Fare Register Fittings
☐ Keystone Air Valves
☐ Keystone Cord Connectors
☐ Keystone Rotary Gongs
☐ Standard Trolley Harps
☐ Standard Trolley Wheels
☐ Automatic Door Signals
☐ Keystone Trailer Connectors

***Punch necessary squares—then send for complete data sheets.***

## ELECTRIC SERVICE SUPPLIES CO.

***Manufacturer of Railway Material and Electrical Supplies***

**PHILADELPHIA**
**17th and Cambria Streets**

**NEW YORK**
**50 Church St.**

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**Monadnock Building**

**Branch Offices: Boston, Scranton, Pittsburgh**
**Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto**

**The Philadelphia & Western Railway Co.**

in its newest interurban car,
has ceilings and wainscoting of

AGASOTE
(TRADE MARK)

and curtains of

PANTASOTE
(TRADE MARK)

*Specify Agasote and Pantasote for your own new cars*

THE PANTASOTE COMPANY

**11 Broadway, New York**
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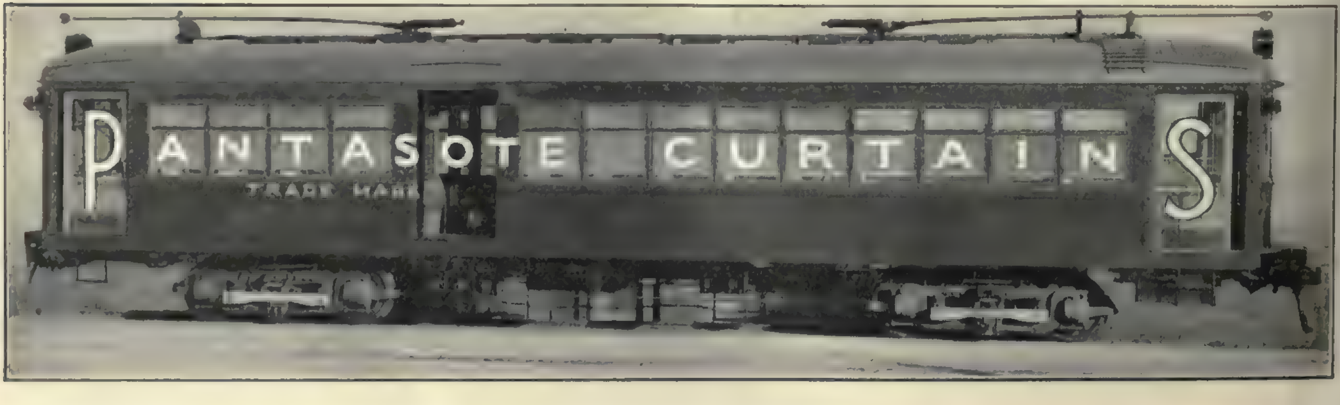
**751 Monadnock Bldg., San Francisco, Calif.**



*Modernize!*

*Pneumatize!*

# What Every Modern Grocer Knows

The average grocery clerk isn't paid as much for his time as your motormen and conductors, but how often do you see a clerk in a real store grinding coffee by hand?

And yet, grinding coffee by hand isn't half as strenuous or one-tenth as frequent a job as opening and closing car doors; but wise grocers don't put up with it any more since, possibly your own central station department showed them that the electric motor gives the clerks time to attend to more customers and with less distraction.

If the use of power is a good thing in a grocery, it is a better thing on a car where *time* is a far more essential element. The relief from avoidable drudgery will not only raise the morale of your men, but will also enable them to

*Concentrate on the care and fare of the patron*

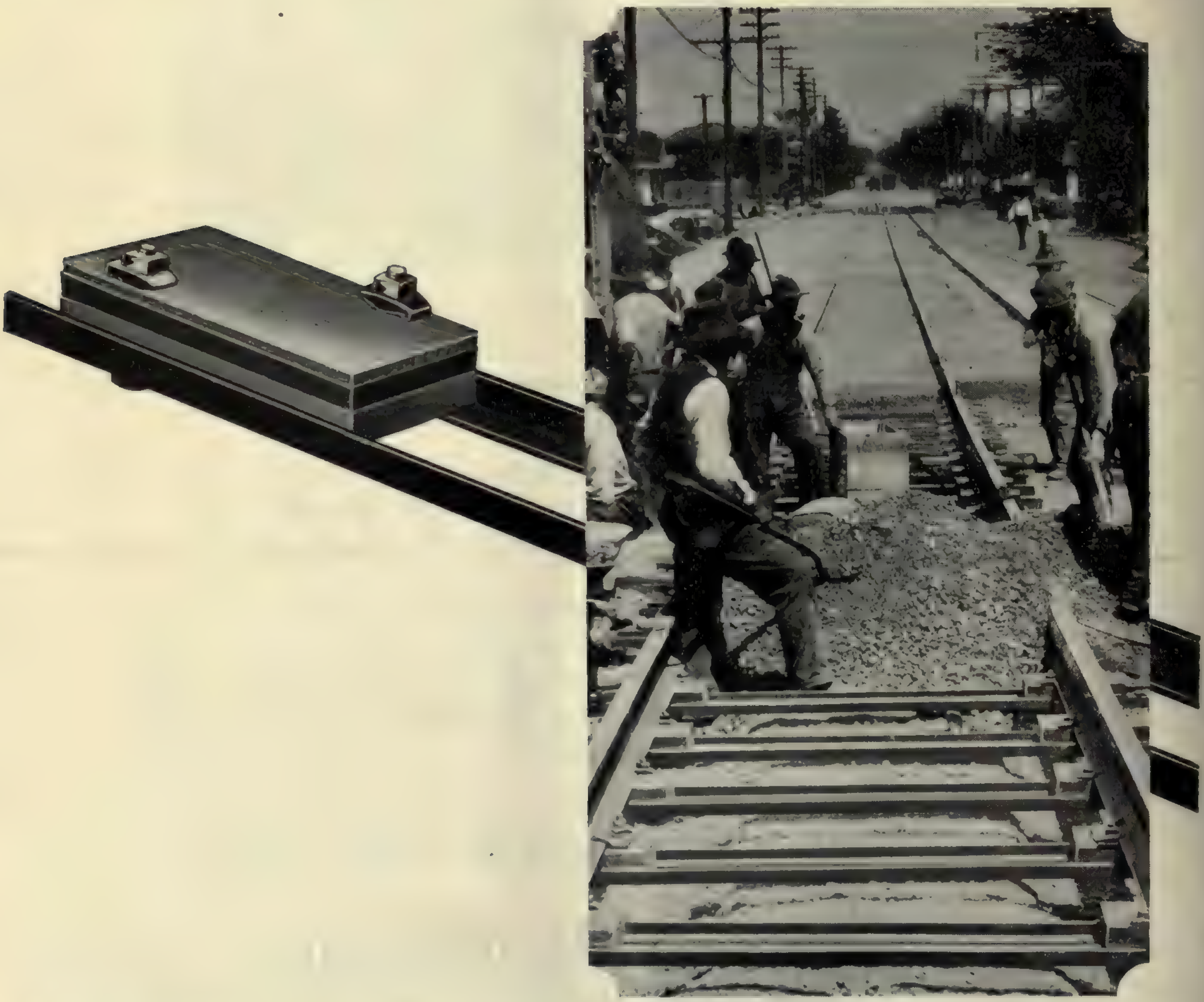
## National Pneumatic

**Door and Step Control**
**Door and Step Operating Mechanisms**
**Motorman's Signal Lights**
**Safety Interlocking Door Control**
**Multiple Unit Door Control**

*Manufactured in Canada by*
**Dominion Wheel & Foundries, Ltd.**
**Toronto, Ont.**

National Pneumatic Company, Inc.
*Originator and Manufacturer*
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

# This Track costs
# it will outlive any



# DAYTON

# Less to install other Construction

## But that is not all—

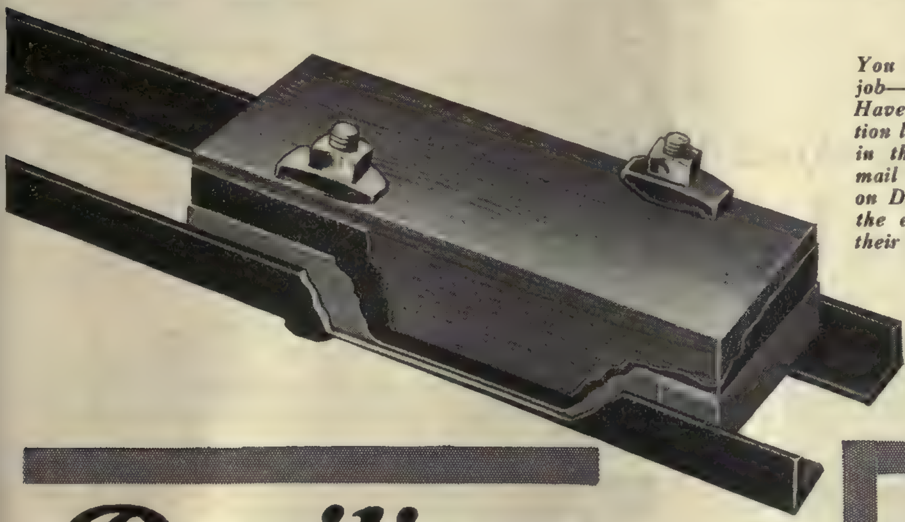
IN ADDITION to saving from $2,000 to $6,000 per mile on first cost of installation—

And in addition to purchasing longer life because the resilient wood and asphalt construction of these ties preserves the track foundation from disintegration caused by vibration and shocks—

You reduce track and paving repairs, especially at the joints because the joint tie is so constructed that it affords a broad bearing surface for the rail. This gives additional strength and resiliency to that most vulnerable portion of the track, enabling it to withstand the blows and shocks to which it is subjected. The steel plate on the joint tie, in addition to acting as a reinforcement, serves as a welding base and eliminates the necessity of copper bonding—

You furthermore reduce upkeep of rolling stock. Ordinary repairs for rolling stock run into large figures and they increase 100% when cars must operate over bad track. It has been demonstrated beyond dispute that there is only one way to avoid these repairs and depreciation, and that is through the application of resiliency in your track construction.

In the near future it will be practically impossible to obtain wooden ties. They are increasing in cost every day. Even now their cost is practically prohibitive. Therefore, if you can build track with ties that not only will reduce your first cost, but at the same time give you longer service and a better track, you will want to use them.



*You want to save money on that next track job—and you want to get a better track. Have the absolute facts about track construction laid before you. Just tear off the coupon in the corner and have your stenographer mail it. It will bring you complete literature on Dayton Resilient Ties and tell you about the experience of others in saving through their use.*

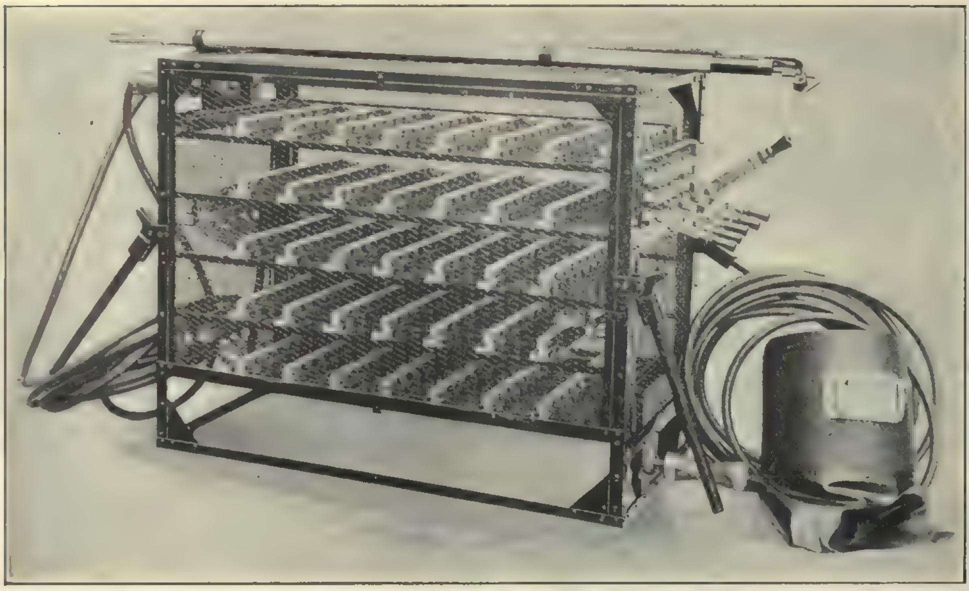
The Dayton Mechanical Tie Co.
708 Commercial Bldg., Dayton, Ohio

**Resilient TIE**

PIN TO LETTER

**Dayton Mechanical Tie Company**
**708 Commercial Bldg.,**
**Dayton, Ohio**

Without obligation, please send me full information about your Dayton Resilient Ties.



# AJAX WELDER

## *—built by railway men for railway work*

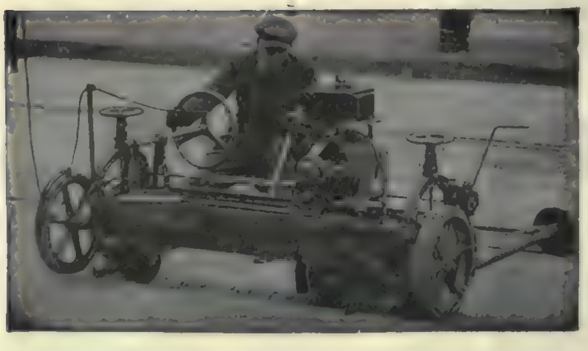
After 12 years of experience building, selling and experimenting with grinders for railway track work, which involved much experience with every kind of welding outfit on the market, we saw the need of a welder designed to meet the special conditions of electric railway track maintenance, and developed the Ajax Welder.

As the only builder of track grinders, we had an enviable reputation to sustain, and withheld the Ajax Welder from the market until several years of experimenting and practical tests assured us that we had produced a welder which meant a real contribution to the industry.

A portable electric arc welder—can be carried on any car platform — weighs only 140 lbs.—no moving parts to get out of order—333 amperes at 600 volts.

### *Use the Ajax Welder with our*

## Track Grinders



The illustration shows our well-known Atlas Grinder, invaluable for use in connection with welding cupped joints, worn down special work, etc. We also sell the Universal and Reciprocating Grinders.

Write today for details and prices on a complete welding and grinding equipment.

**Railway Track-work Company**
**3132-48 East Thompson St.**
**Philadelphia, Pa.**

# Ten Representative Railways Show Good Bonding Can Be Done Economically

## *—Provided You Use Lincoln Bonds and an R-W-B Dynamotor*

Ten representative railway companies have supplied us with data on the installation of Lincoln Bonds, using R-W-B Dynamotors. This information should be of especial value to every railway engineer. While conditions vary in different localities, still you can see how economical this method is; and when you take into consideration the superiority of this bonding, its economy is more apparent.

Data on Installation of Lincoln Bonds

| Names of Railway Companies Supplying Information | No. of Men in Crew | No. of Bonds per Day | No. of Pencils per 100 Bonds | No. of Pencil Holders per 100 Bonds | No. of Moulds per 100 Bonds | Scrap Copper per 100 Bonds (Lbs.) | Actual Welding Time per Bond | Traffic Conditions |
|---|---|---|---|---|---|---|---|---|
| Illinois Railway | 3 | 225 | 12 | 3 | 2 | 18.8 | 60 sec. | 10 min. |
| Indiana Railway | 3 | Night 200<br>Day 100 | 4.1 | 3 | 2.7 | 14.3 | 45 sec. | 30 min. |
| Missouri Railway | 4 | 177 | 3.5 | 2 | 2.5 | 13.54 | 40 sec. | 1 car per hr. |
| Kansas Railway | 4 | 240 | 6 | 1 | 1.5 | 20 | 40 sec. | 3 cars per hr. |
| Wisconsin Railway | 3 | Webber 75 | 5 | 3 | 6 | 25 | 3 min. | 1 hr. |
| California Railway | 3 | 120 | 2.9 | 2.13 | 1.23 | 17.5 | 70 sec. | 1 hr. |
| Ohio Railway | 3 | 200 | 8 | 3.5 | 1 | 15.62 | 2 min. | 1 hr. |
| Colorado Railway | 2 | 110 | 3 | 3 | 3 | 20 | 2 min. | .............. |
| Washington Railway | 2 | 150 | 8 | 2 | 1 | ........ | 60 sec. | Night work |
| Oregon Railway | 2 | 48 | 5.5 | 3 | 2 | 25 | 2 min. | 30 min. |
| Montana Railway | 2 | 150 | 5 | 2 | 2.5 | 12.5 | 3½ min. | Varying |
| Averages | 3 | 161 | 6.5 | 2.7 | 2·9 | 2.8 | 1min15sec | |

Averages taken from the above sheet were as follows:

| | |
|---|---|
| Number of men in crew | 3 |
| Number of bonds per day | 161 |
| Number of pencils per 100 bonds | 6.5 |
| Number of pencil holders per 100 bonds | 2.7 |
| Number of moulds per 100 bonds | 2.9 |
| Scrap copper per bond | 2.8 oz. |
| Actual welding time per bond | 1 min. 15 sec. |
| Average day's work | 8 hours |

### *COSTS*

| | |
|---|---|
| Carbon pencils used for 161 bonds installed 10.4 at $0.06 ea. | $0.624 |
| Pencil holders used for 161 bonds installed 4.3 at .25 ea. | 1.075 |
| Carbon moulds used for 161 bonds installed 4.7 at .30 ea. | 1.41 |
| Energy used at 335 watt hrs. per bond for 161 bonds installed per Kw.H., $0.02 ea. | 1.08 |
| Labor necessary, two men at $4.00 and one at $3.00 a day | 11.00 |
| Scrap copper used for filling in head of bond, using 2.8 oz. per bond, or for 161 bonds, per lb., $0.10 | 2.82 |
| | $18.009 |

$$\frac{\$18.009}{161} - 0.111$$

| | |
|---|---|
| Lincoln LU 4/0 Bond (16c. copper) | $0.3083 |
| Installation cost | .111 |
| Total cost of bond and installation | $0.4193 |

**The many uses of the R-W-B Dynamotor on the line and in the shop make this equipment of greatest value to electric railways. Besides carbon arc bonding, it is widely used for Lincoln Carbon Arc Process of welding fish plates and for metallic track and shop welding.**

# Rail Welding and Bonding Company

*Formerly The Lincoln Bonding Co.*

RWCoB

**Cleveland, Ohio.**

**New York Office**
**30 Church Street**

**Chicago Office**
**343 So. Dearborn St.**

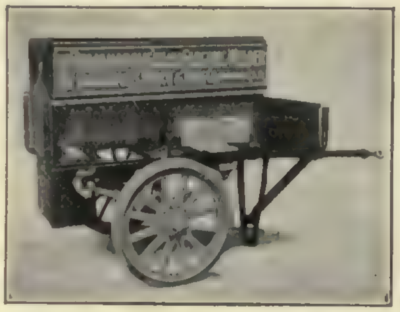
**London Representative:**
**Electrical Apparatus Export Corporation, 408-9 Bank Chambers—High Holborn**

# You can have the use of an "Indianapolis" Electric Welder

## for $2.00 a day for three hundred days—then it is yours

## You can save as much as $200.00 a day, many days, the meanwhile.

***The Welder***



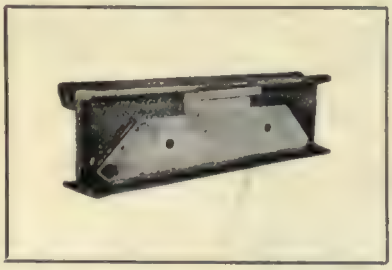
- Builds up WORN MANGANESE Successfully
- Fills up CUPPED RAIL ENDS permanently
- Reclaims WORN SPECIAL WORK quickly
- Repairs ROLLING STOCK EQUIPMENT
- Applies "INDIANAPOLIS" Welded Joint and Bond Plates
- Welds, Steel faced BONDS—and EVERYTHING

---

*Nothing better yet produced for saving money for Street Railways*

---

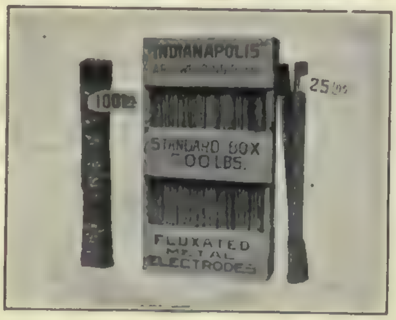
***The Joints***



After 10 YEARS' test, still the BEST Maintenance ELIMINATOR on hundreds of miles of track in PAVED STREETS.

A Proven, uniform, dependable product, the main factor in the universal success of Indianapolis Welding, insuring RESULTS—WELDING that "STAYS PUT."

***The Welding Steel***



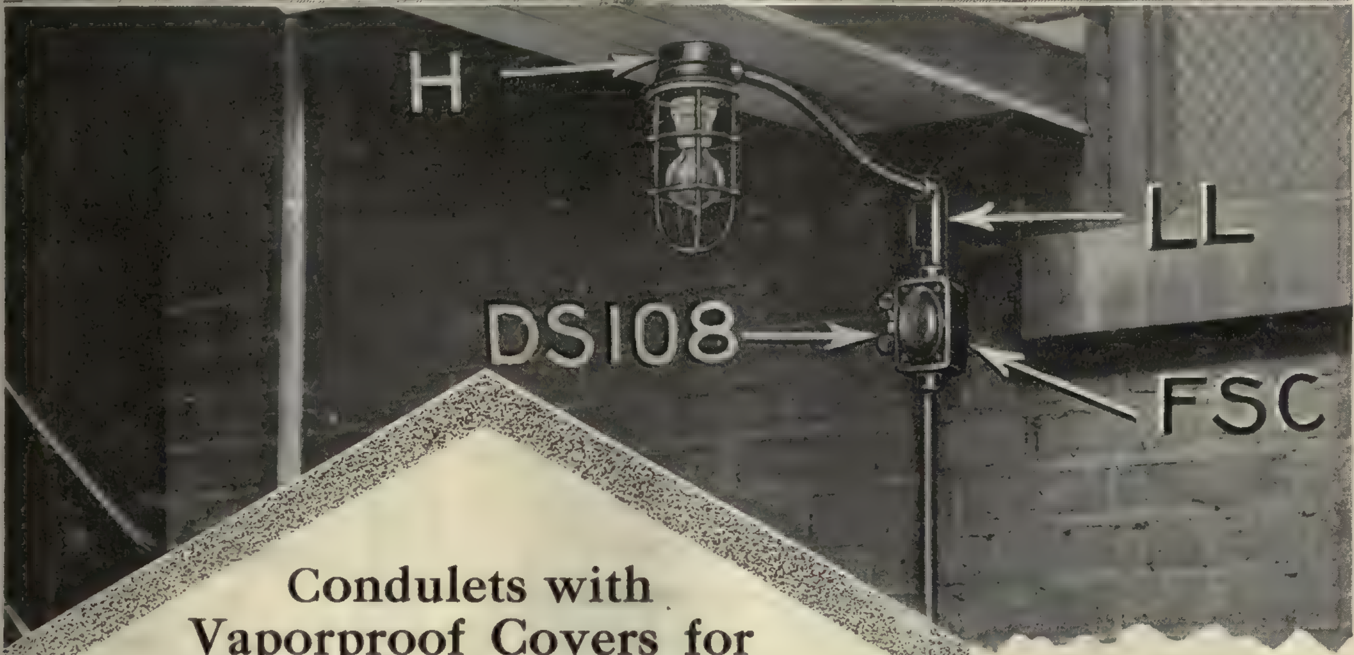
***Attest***

- More Roads using the "Indianapolis Method" than ALL OTHER methods COMBINED.
- More Roads using "Indianapolis Welded Joints," than are using all types COMBINED.
- More "Indianapolis Fluxated Welding Steel Electrodes," used for TRACK purposes than all other brands of welding wire COMBINED.

**The Indianapolis Switch & Frog Co., Springfield, Ohio**

J. J. Costello, Boston, Mass., New England Representative

# CONDULETS

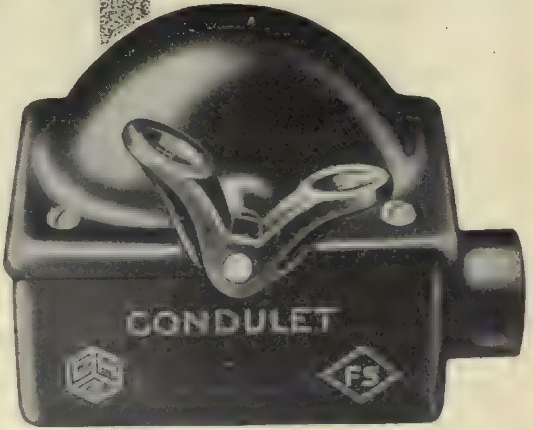


## Condulets with Vaporproof Covers for Push Button Switches

THE combination of FS Condulet with DS 108 cover makes a substantial vapor, gas, dust, and water-tight enclosure for push button switches.

A rubber gasket effectually seals the joint between the body and cover. The hole for the shaft is a tight fit and sealed with grease which prevents corrosion and entrance of moisture at this point. These Condulets and covers make possible the use of push button switches in oil houses, garages, refineries, flour mills, bakeries, munition factories, grain houses, cleaning establishments, docks and boats, under conditions where heretofore the use of these switches has been considered impractical and in fact wherever an open arc would be dangerous or the atmosphere harmful to the switch mechanism.

Send for Condulet Catalog.



*FS CONDULETS*
**The operating handle is marked so as to indicate when switch is "on" or "off."**

CROUSE-HINDS COMPANY
SYRACUSE, N. Y.
BOSTON NEW YORK CHICAGO
Condulets Panelboards
Knife Switches Floodlights
Guy Anchors
1613

*Condulet the Job*

# CROUSE-HINDS

# The Conductor and His Job

Your conductors are in a position to gain and keep the good will of the public and to build up business for you. Give them a chance.

The Ohmer System of fare collecting and fare accounting places the conductor in the position of a responsible salesman of transportation and he soon learns that the better he serves your interests the better he serves himself.

The Ohmer System gives him means for indicating and recording each transaction as it takes place. This is good business. Every successful merchant knows it is the best way to handle sales.

The Ohmer System points out to the management the characteristic tendencies of each conductor and indicates the sort of discipline which will do the most good. The Ohmer System stands for the best of modern business methods applied to city and interurban electric railroading.

**Ohmer Fare Register Company**
**Dayton, Ohio**

# Energy Absorption

D-17 Oil Circuit Breaker

When railroad trains clank over the rail joints, the *spring suspension* of the heavy car bodies takes up the shock—protects trucks, track and freight from damage—safeguards passengers and crew from discomfort and danger.

And when the CONDIT D-17 Oil Circuit Breaker opens a high power circuit it's the *spring suspension* of its tank construction that takes up the impact of expanding gases—protects the breaker from impairment—safeguards life and property, and the service of your plant, from possible hazard. Get Advance Sheet No. 445.

**CONDIT ELECTRICAL MFG. CO.**
*Manufacturers of Electrical Protective Devices*
**Boston 27, Mass.** 122-29

Northern Electric Company, Ltd.
Sole Distributor for the
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**SPECIFICATIONS:** 1, 2, 3 and 4 Pole; Cell Mounting Manually and Electrically Operated; 500, 800 and 1200 Amperes at 15,000 Volts; 500 and 800 Amperes at 25,000 Volts.

CONDIT

# Standard of Safety
# For All Types of Cars and Service

Safety and Double-Truck City Cars, Brooklyn Rapid Transit Co.

# H-B Life Guards

Large Summer Car on Public Service Railway, N. J.

Electric Railway in New South Wales

After wide experience in the development of car fenders and life guards, we take justifiable pride in the fact that our H-B Life Guard has become the almost universally recognized standard in this line.

Scarcely a place you can go now-a-days that you do not see the standard safety car with its ever-present ally of safety, the H-B Life Guard. Equip all your cars, old and new, for maximum safety.

**The Consolidated Car Fender Co.**
**Providence, R. I.**
*General Sales Agent*
**Wendell & MacDuffie Co., 61 Broadway, New York**

# "NATIONAL" TUBULAR STEEL POLES

EXPERIENCE has taught many valuable lessons in the selection of poles for trolley lines, electric lighting, telephone, telegraph, and signal systems. Perhaps the lessons of greatest value are those which resulted in the policy of choosing poles for long life, reliability, and, especially, for safety. The recognized safety (dependability) of "NATIONAL" TUBULAR STEEL POLES is a consideration of first and ultimate importance as evidenced by the extensive use of "NATIONAL" POLES throughout America.

*Ask for a copy of "NATIONAL"*
*Bulletin No. 14—"NATIONAL"*
*Tubular Steel Poles*

## NATIONAL TUBE COMPANY, PITTSBURGH, PA.

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**V-K**

**OILLESS TROLLEY WHEEL**

*The booklet "Trolley Wheels" contains a fund of vital facts on various types of More-Jones Trolley Wheels and Harps. Write today for a free copy.*

**Costs less per mile**

Perfect lubrication plus maximum conductivity is a combination which makes V-K Oilless Trolley Wheels lowest in ultimate cost and highest in net efficiency. Examine the construction of the V-K Wheel and you'll see why. Notice that it's properly balanced and mechanically perfect in finish. The metal from which it is made is specially tough but not hard. This means greater mileage and at the same time least detriment to overhead construction. The patented Oilless (graphite and bronze gauze) bushing is non-insulating, heat-proof, long-lived, easy interchangeable.

The V-K trolley wheel used with the V-K non-arcing harp will do more to reduce trolley maintenance cost (both wheel replacements and overhead repairs) than any other current collector on the market today.

A trial will convince you as it has hundreds of other executives in charge of operation and maintenance.

**More-Jones Brass & Metal Co.**
St. Louis, Missouri

TROLLEY WHEELS:
*V-K Oilless, M. J. Lubricated*
HARPS: *V-K Non-Arcing*
BEARINGS: *"Tiger"*
*Bronze*
*Axle and Armature*
ARMATURE BABBITT
*and Similar Products*

**MORE-JONES**

**McGUIRE-CUMMINGS MANUFACTURING CO.**
CHICAGO

**SNOW SWEEPERS**

*Now is the time to check up on your snow fightng equipment for the coming winter.*

*McGuire-Cummings Single and Double Truck Snow Sweepers and Plows are "Standard Equipment" on practically every Electric Street Railway Line in the United States and Canada that has snow to contend with.*

*Specifications and drawings upon request.*

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City and Interurban Cars and Trucks,
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Electric Locomotives

GENERAL OFFICES
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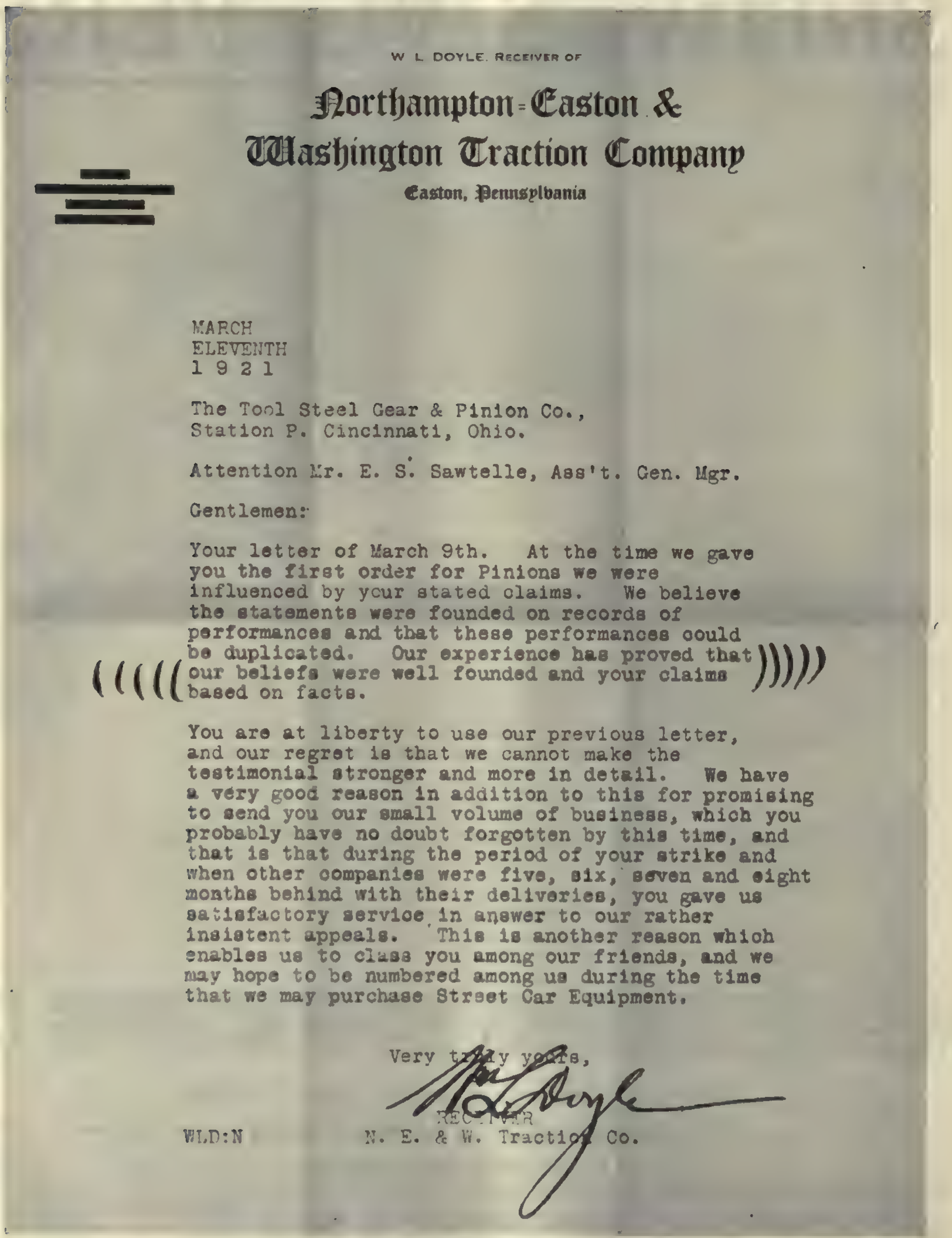
T. S. Q. means this



W. L. DOYLE, RECEIVER OF

**Northampton-Easton & Washington Traction Company**

Easton, Pennsylvania

MARCH
ELEVENTH
1 9 2 1

The Tool Steel Gear & Pinion Co.,
Station P. Cincinnati, Ohio.

Attention Mr. E. S. Sawtelle, Ass't. Gen. Mgr.

Gentlemen:

Your letter of March 9th. At the time we gave you the first order for Pinions we were influenced by your stated claims. We believe the statements were founded on records of performances and that these performances could be duplicated. ((((( Our experience has proved that our beliefs were well founded and your claims based on facts. )))))

You are at liberty to use our previous letter, and our regret is that we cannot make the testimonial stronger and more in detail. We have a very good reason in addition to this for promising to send you our small volume of business, which you probably have no doubt forgotten by this time, and that is that during the period of your strike and when other companies were five, six, seven and eight months behind with their deliveries, you gave us satisfactory service in answer to our rather insistent appeals. This is another reason which enables us to class you among our friends, and we may hope to be numbered among us during the time that we may purchase Street Car Equipment.

Very truly yours,

W. L. Doyle
RECEIVER
N. E. & W. Traction Co.

WLD:N

"Tool Steel" Quality **T. S. Q.** "Tool Steel" Quality

The World's best Lubricants

# A Mole Hill in Cost
# *but*
# A Mountain in Importance

The first cost of lubricating oils is a small item compared with the total expenses of railway operation.

But no single factor exercises a more vital function in determining efficiency of operation than that of lubrication.

There is a distinction between cost of lubricating oils and cost of lubrication. First costs do not necessarily mean final costs. Inferior lubrication demands a tax in repairs and replacements far in excess of the original cost of oils—a tax that *must be paid.*

If this tax—which is inevitable with the use of cheap lubricants—were added to the first cost, the price per gallon would be prohibitive. Yet it is there and is bound to show in the expense column.

Efficient railway executives know that this is a fact; experience and cost records have shown it. It follows that their judgment in specifying *Galena Oils* is simply sound common sense.

The first cost is the final cost and the records on hundreds of electric railways prove that Galena Service is a guarantee of economy, as well as efficiency.

***It is not the gallon, but the lubrication units the gallon contains—that count.***

TRIGRAM TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
*Offices in all principal American Cities*
LONDON BUENOS AIRES PARIS

GALENA SERVICE

*A little care and forethought in selecting the carbon brush for your motors will be repaid by the absence of commutator troubles*

# Which Brush for Your Motors?

Picking brushes for motors is a good deal like selecting shoes—some fit and some do not and not every style will suit each individual wearer.

A large proportion of commutation troubles are directly traceable to improper brushes—not necessarily poor quality but a grade not suited to conditions.

G-E carbon brushes are made in grades to suit every type of motor and every operating condition. G-E brush specialists will study your needs and prescribe exactly the brush for maximum satisfaction and economy. Their services are at your command.

G-E Brushes maintain the "Original Equipment Quality" of G-E Motors.

**General Electric Company**

General Office
Schenectady, N.Y.

Sales Offices in
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# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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*Volume* 58 New York, Saturday, August 6, 1921 *Number* 6

## Any Car Any Time for Any Distance

ELSEWHERE in this issue is an account of nearly two years' operation of the unlimited ride, $1 weekly pass at Racine, Wis. When this plan for increasing off-peak riding was first broached, it was assumed by some to be a revival of the European style pass, while others were skeptical about a form of selling transportation that left no tangible record.

As regards the latter point, the experience of the Racine division of the Milwaukee Electric Railway & Light Company indicates that it was not even necessary to continue recording pass presentations on the former transfer registers. With two special surveys made more than a year apart, showing the average number of rides per business day per pass holder to be slightly less than four, it seems proper to assume that the average number is so steady that multiplying pass-holders by four will give a reasonably correct figure for the average number of daily revenue rides taken by them. This holds at least for the towns of the size of Racine and Kenosha where a thorough knowledge of ride-making conditions is possible.

As regards the former point, this pass is not the same as the European kind because it is necessary in Racine for a pass holder to be better than a compulsory twice-a-day rider in order to save by its use. The figure of average rides quoted above shows that this principle has been effective. While the pass-holder pays only 4 cents per ride he gives the company 16 cents per day, which is more than would be likely to be realized from either cash or ticket riders. No one can say how much more revenue has come to the railway through the pass, but from Mr. Jackson's account it is apparent that the pass has definitely helped to better safety car operation, to improve off-peak riding and to foster the welcome habit of taking any car any time for any distance.

## Changes in Taxation Could Well Be Made

THE recommendations of Secretary Mellon to eliminate the higher surtax rate if carried into effect should be of help to all utilities and other issuers of investment securities. It is a well known fact that these higher surtax rates have been so high in the past as to defeat their own purpose. If the rates for large incomes were lower, the holders of those incomes could again afford to invest in public utility bonds rather than the tax-exempt issues of cities, counties and states.

Of course, the clean cut thing to do as a basis of any logical taxation system is to provide that no more tax exempt securities be issued—that the income from all classes of securities be treated alike. The McFadden resolution, now before Congress, proposing a constitutional amendment to that effect should be supported and pushed to an early adoption. But such things take time and meanwhile revenues must be collected and the best immediate moves must be determined.

The recommendation of Secretary Mellon that the transportation tax be cut in half should be of help to the interurban roads as well as trunk roads. On the other hand, his suggestion that the normal income tax be increased to 15 per cent would affect many companies adversely, and the suggestion sometimes made that a special tax be laid on undistributed income would affect electric railway companies still more.

The fact is, as President Gadsden pointed out recently before a committee of Congress, the conditions under which public utilities operate are so different from those which apply to most other corporations as strongly to suggest the advisability that for taxation purposes they should be in a class by themselves. Their rates, return and most of their expenses now are regulated by law; in taxation only are they put in a class with other companies. This is an anomalous condition and its correction can well be considered by our legislators.

## Efforts to Preserve Proper Financial Balance

PRACTICAL application is about to be made by the North American Company of the theories of finance stressed by Lucien H. Tyng, chairman of the sub-committee of the American Bankers' Association, in the interim report made recently entitled "The Importance of Adequate Junior Financing." Mr. Tyng quoted an elaborate compilation covering a period of fifteen years to prove a combined note and bond financing among utilities of 79.18 per cent and a combined stock financing of 20.19 per cent as against a theoretically correct fifty-fifty. He said that it served no useful purpose simply to say that the companies must do more junior financing and that the time to avoid any responsibility for reorganization was when dangerous tendencies became evident and before disaster has happened. Thus he stressed points also made by F. K. Shrader before the American Electric Railway Association at its meeting last winter, at which Mr. Shrader, an investment banker, warned against a continuation of the tendency of the past to borrow money rather than to sell share capital.

This is the warning that the North American Company is heeding under the plan for the readjustment of its capital outlined in a recent issue. In this particular case there was no need for immediate concern for the financial future of the company, but there was honest realization on the part of the directors of the fact that continued exclusive use by subsidiaries of bonds and notes to finance the cost of added facilities tends in time to produce a financial structure top-heavy as regards debts, and to impair the credit of the parent company and its subsidiaries. It is an interesting change, this division of the $29,793,300 stock, all common, of the North American Company into even parts of common and of 6 per cent preferred, with the new preferred ranking as an investment issue and the new common as an issue with prospects of participation in the profits to a degree that should hold it near par. No less interesting in its way than this change is the announcement of the offering of $3,000,000 of 8 per cent preferred stock over the counter by the Milwaukee Electric Railway & Light Company, for the same principles of finance are involved. The cost of the money to the company may be a trifle higher under the present plan than would have been the case had resort been had to the issuance of bonds or notes, but then a redemption privilege has been inserted in the stock that may prove very valuable in the future as the practice in the past with the bond offerings has been to make them non-callable.

By the new issue of stock in Milwaukee the proportion of bonds and other secured obligations to stocks outstanding has been changed for the better on that property because of the arrangement wherein the secured debt stands at $37,532,000 contrasted to $17,350,000 of stock, composed of $7,500,000 of preferred and $9,850,000 of common. These are not the theoretically perfect proportions advocated by Mr. Tyng, but they are an approach toward them that cannot but be helpful to the company.

## Brains Plus Machines Are Cheaper than Muscle

A VISITOR to the Youville Shops of the Montreal Tramways a few years back, say early in 1914, would probably have pronounced the equipment and practices to be about right. The buildings were modern, the layout was good, and while few of the machines were new they were all in good condition. The fact that much progress has been made recently at Youville, however, is disclosed by an article in this issue, which tells how costs have been controlled through a complete analysis of shop operations.

Fortunately for Canada, the tramways shops were so well organized that when the war broke out they were able to take on a huge job of shell-making, which was completed with the same dispatch that is expected of a concern regularly engaged in manufacturing. This, of course, required a supplemental force of men and additional machinery, but the *esprit de corps* which was behind the shell work done for the government was the regular spirit of the shops, intensified by patriotism. The stimulus of the war work, added to the necessity for economizing in materials and labor, was a contributing factor to the improvement in shop methods outlined in the article.

This improvement has been wrought through close attention to detail, to individual operations. Take, for example, lifting, which was seen to be a time and energy consumer, and which afforded an attractive opportunity for saving. Lifting was minimized by the simple expedient of keeping heavy pieces on as nearly the same level as possible. Lost motion in transferring pieces from place to place was also eliminated by careful routing and loss of effort through unfamiliarity of men with jobs was reduced. And, not least in importance, reclamation work was systematized to the limit.

The Montreal Tramways has been doing only what other railways in Canada and the United States have been forced or impelled to do under stress of the same conditions. It does not pose as a model; in fact, the information in this week's article was obtained entirely on the initiative of this paper. At the same time it is only fair to say that the principles so well exemplified at Montreal have wide application. The results secured there show what concentration on the fundamentals and the resulting judicious use of machinery will do in cutting out waste in the shop.

## Two Opposing Policies Separated by a Few Miles

THE eyes of the electric railway industry are now focussed in an all-absorbing manner on the situation in Detroit where municipal ownership is making miraculous headway both in respect to the growth of its physical property and its popularity with the public. Such being the case, a rather unique circumstance in regard to public ownership is of particular interest. On June 4 there were quoted in this paper several paragraphs from an article in the *Saturday Evening Post* written by a "country banker." He tells how a certain city, undoubtedly St. Petersburg, Fla., took over the dilapidated rolling stock and plant of the railway operating there after it had become bankrupt. The transition was quick and simple. The city fathers picked their operating staff and the new manager was allowed to proceed unbridled by his superiors and unmindful of the customary financial restrictions and the economies of the problem. He promptly junked all old equipment and purchased new, and generally revamped the property according to his own idea of adequacy. Our observer relates that the fare is 5 cents and a very satisfactory service is maintained. However, his inquisitiveness failed to be aroused to the point of learning what return on the capital a rigid system of bookkeeping would show. But why worry about such an inconsequential detail if the local riders are boastful of their service? Their ignorance that the final reckoning is in the tax rates merely adds another confirmation to the truth that some of the people can be fooled all the time.

Here is the flagrant inconsistency. A luring opportunity exists in Miami, on the coast of Florida, to secure a liberal franchise for the operation of a railway there. The Chamber of Commerce and all other civic bodies, as well as the City Council, are extremely anxious to have someone look into the proposition. They will gladly assure their assistance in getting a franchise without restrictions as to rates, paving of streets or other outside expenses. There are already in place 5 miles of track which can be secured at a price considerably under reproduction cost. These two cities, comparable as to permanent and transient residents, certainly are at wide variance as to solution of their respective transportation problems.

Is one a case of optimism and over-confidence and the other of perhaps adequate detailed study? The guess might safely be hazarded that the Miamians are not the only ones to have investigated with thoroughness the proposition, for as yet no takers have been reported. What seems so strange is that two cities, located so close to each other, should decide upon such opposed methods of operation. It might pay those in whose hands the direction of Miami's municipal affairs rest to direct their efforts toward "selling" the natives on their becoming the owners of this promising property. Nevertheless, the potent question suggests itself: What are the characteristics and virtues of public operation and ownership that mark it as apparently a desirable condition in one place and exclude it from consideration as a solution in a neighboring city? Perhaps the balmy air of Florida is not conducive to consistency.

PANORAMIC VIEW OF THE MAIN SHOP BUILDING

# Cutting Out Waste in the Shop

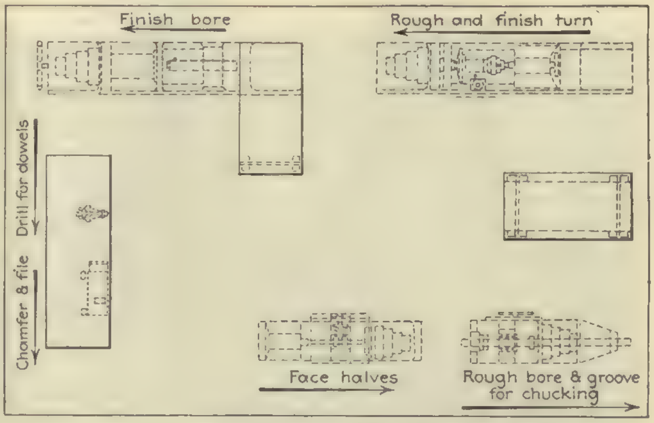
### Montreal (Que.) Tramways Has Well-Equipped Shops Which Were Utilized for War Work—Salient Principles Applied in Maintenance Practice Are Minimizing of Lifting Operations, Effective Routing of Machine Jobs and Permanent Repair of Defective Parts

IN ITS shops at Youville the Montreal Tramways possesses unusual facilities for maintenance work on rolling stock. These shops were described in the issue of this paper for July 11, 1914, page 60, but since they were built many improvements in details have been made. The panoramic view reproduced shows the general appearance of the front of the main buildings, while the outline drawings give the present layout of machines for finishing axle bearings.

The manufacturing possibilities of the shops were so good that the Canadian government utilized them during the war for shell manufacture, and about 80,000 each of 6-in. and 8-in. H.E. shells of fine quality were turned out. This involved the installation of much new machinery, some of which was made a permanent part of the shop equipment after the war contracts were completed. All of this war work was under the direction of D. E. Blair, superintendent of equipment and shops, in addition to his regular duties.

In all of the maintenance work the aim is to prevent recurrence of defects by replacing worn and broken parts with others of more substantial nature, as will be illustrated in the present article. Climatic conditions make this unusually necessary, as the effects on the paving of freezing and thawing are severe. Each spring there is an epidemic of motor frame breakages due to this cause, an especially bad season resulting in a crop of 250 or more motor frame breakages during the winter. This condition also causes the breakage of a very large number of truck frames. By co-operation with the track department this trouble is being attacked at the root, while more economical repair and maintenance methods are being introduced in the shop.

One of the most notable recent improvements in maintenance procedure has been in the handling of supplies, particularly in collecting parts of equipment from the carhouses and in furnishing overhauled parts. This is done with one supply car, manned with a crew of two, who are reinforced locally at the carhouses by two additional men. In a working day of nine hours this car visits all of the five carhouses on the property, whereas until the present routine was adopted two cars, for twelve hours per day, were required. The car is loaded up to about 20 tons on each trip. It also handles all incoming mechanical department stores from down town to the shops.

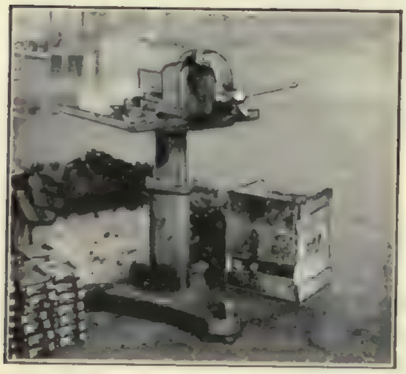


ROUTING DIAGRAM FOR FINISHING AXLE BEARINGS

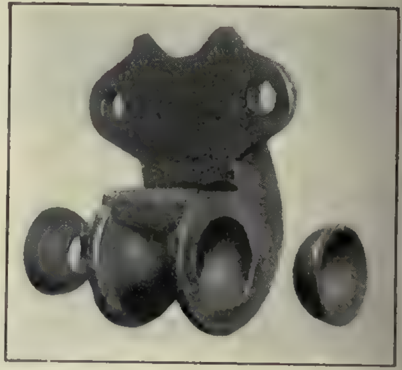
This supply car is shown in one of the illustrations. (See also issue of this paper for Jan. 10, 1914, page 88.) One feature is the gib crane of 3,000-lb. capacity, operated by a small electric motor which is effective in handling wheels, etc., and which has a working radius of 12 ft. The supply compartments are also notable, particularly those for armatures. These are on the floor level and have covers hinged at the bottom so that they can be used to support the armatures in a convenient position for attaching the chain hooks of the air hoist suspended from an I-beam running above the wall racks

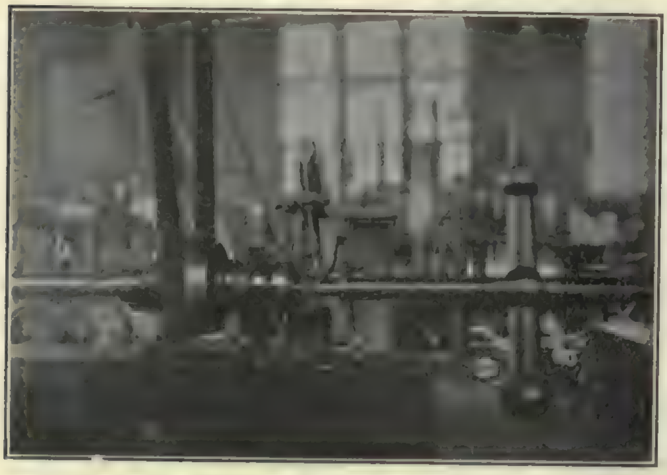
WHERE THE AIR COMPRESSORS ARE MAINTAINED AND TESTED

CARS AND MACHINES IN THE GENERAL OVERHAUL SHOP

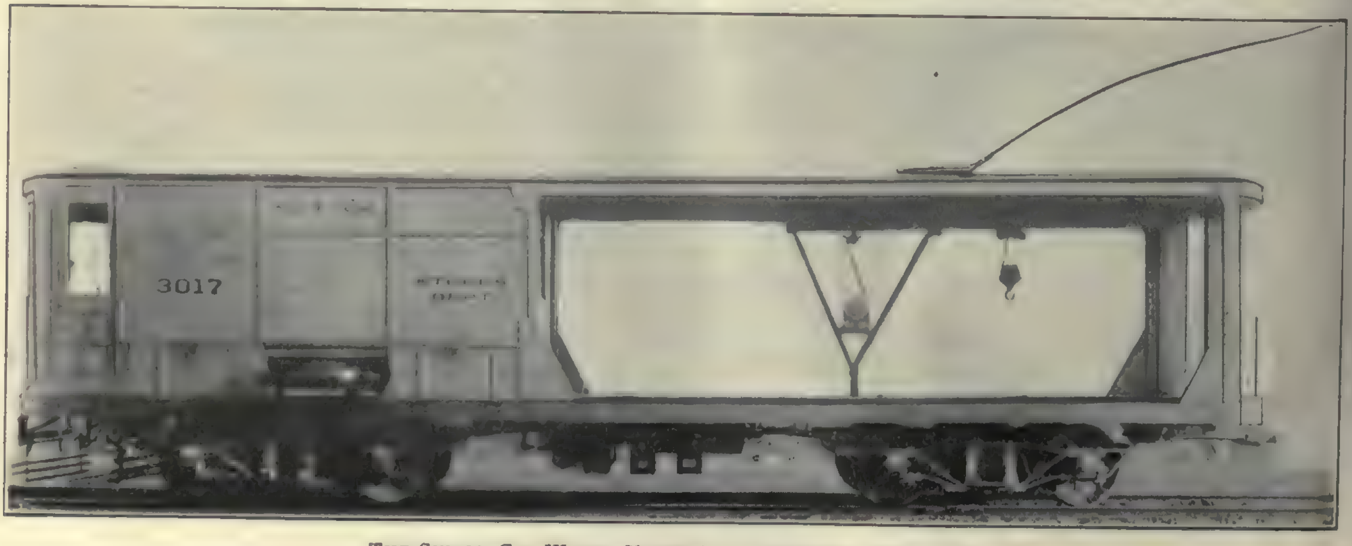

PORTABLE VISE BENCH FOUND USEFUL AROUND THE SHOPS

## Careful Arrangement of Shop Machinery and Equipment Has Marked Effect on Quality of Maintenance Work Produced

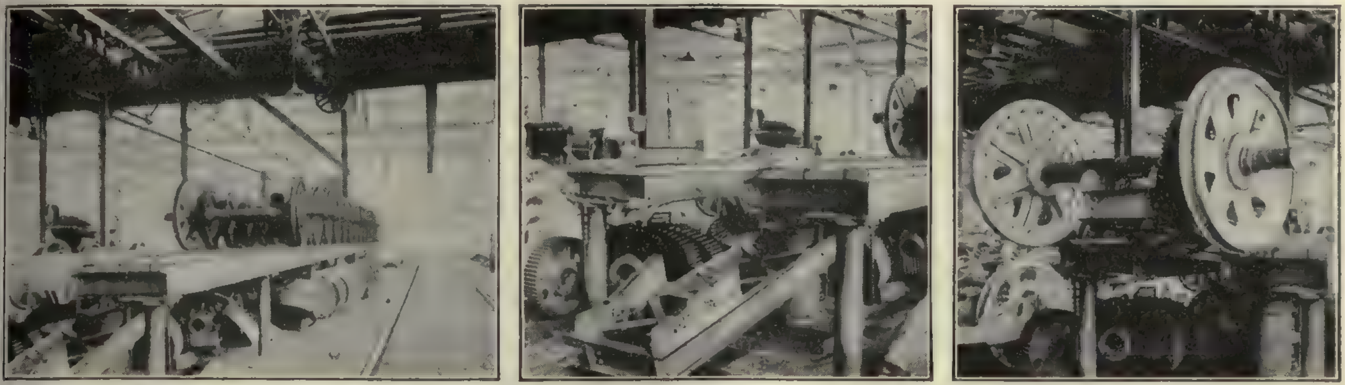

BRAKE HANGER SOCKET CASTING WITH DISHED LINERS


HOME-MADE WINDING MACHINE FOR HEATER COILS

A "STILL LIFE" VIEW IN THE WOOD MILL



THE SUPPLY CAR WHICH VISITS ALL CARHOUSES ONCE A DAY



THE WHEEL AND AXLE STORAGE AND LOADING PLATFORM ALONGSIDE THE SUPPLY CAR TRACK
At left—General view of the platform. In center—The lift in position ready to be loaded.
At right—Wheels and axles raised and ready to roll along the platform.

in the carhouses. Thus the armatures are handled from the carhouses to the winding stands and returned to the pit jacks in the carhouses without running any chances of being damaged by being rolled over floors.

A loading platform for wheels has recently been built in the wheel shop. It merits more than passing notice due to the reduction which it has made in the cost of handling wheels. Several pictures are reproduced to show the details. The main purpose of this platform is to permit storing of wheels on the axles on the level of the floor of the supply car. Incidentally it provides a space underneath for the storage of gear cases, etc. It is a time saver in eliminating a comparatively slow lift by the supply crane, the saving amounting to from thirty to forty-five minutes per day.

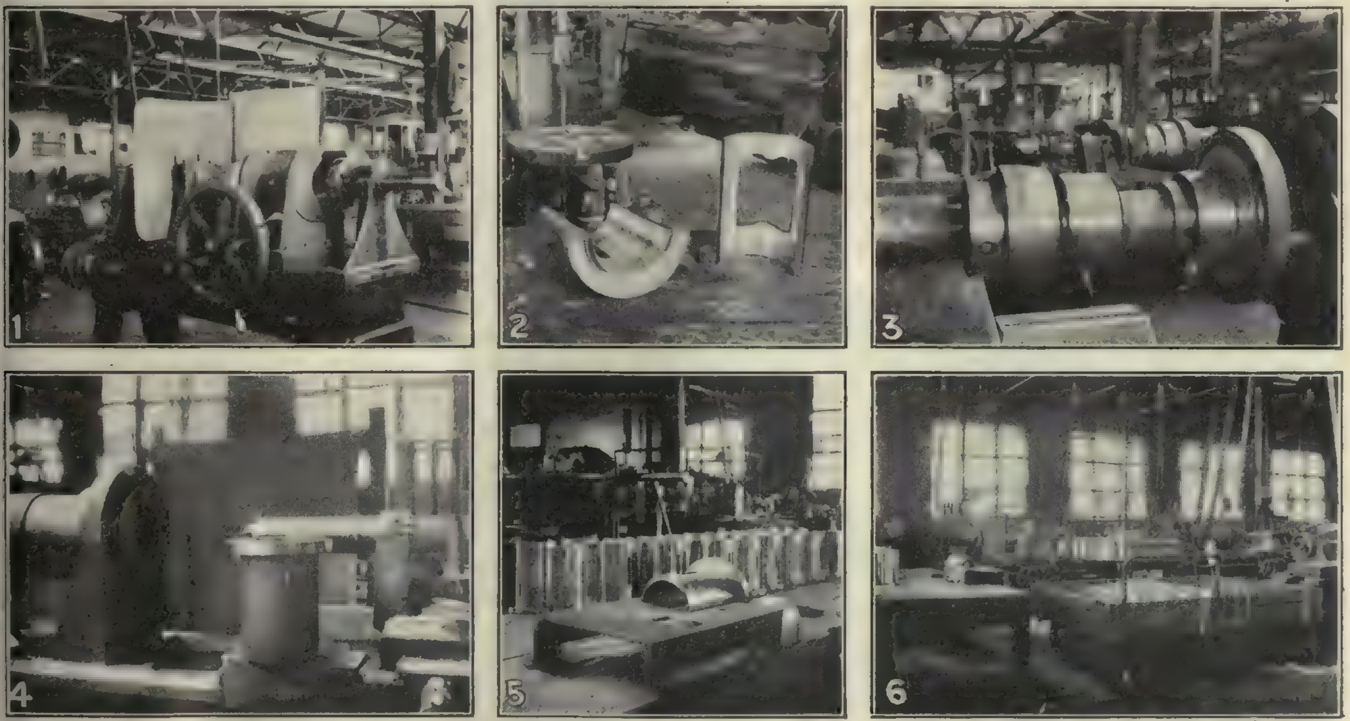
The platform is mounted on a steel underframe of channel sections with columns of 6-in. pipe terminating in flanges top and bottom. At one end is an air-operated lift consisting of a rectangular frame of channels, latticed to stiffen it and hinged to the platform underneath at a distance of several feet back from the end. At the outer end of the lift crane is a cradle made of two wood blocks, curved slightly on the upper surfaces to prevent the axle from rolling off until the lift has been raised sufficiently to permit the wheels to roll down the strap rails laid on the platform.

The lift is raised and lowered by means of a cylinder removed from an old bulldozer, with a control lever mounted alongside the lift and connected with the valve on the cylinder by means of a rod visible in one of the pictures.

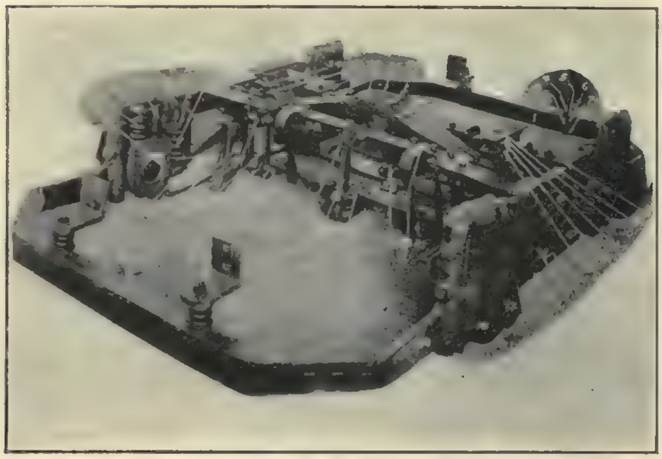
On the platform are two sets of rails, offset so that the wheels and axles will be staggered to economize space.

### RECLAMATION WORK IS WELL SYSTEMATIZED

Very little material goes to the junkman from the Youville shops which offers any possibilities in the way of economical reclamation. Reclamation work is handled here according to a manufacturing-type program designed to incorporate simplicity, thoroughness and common sense.

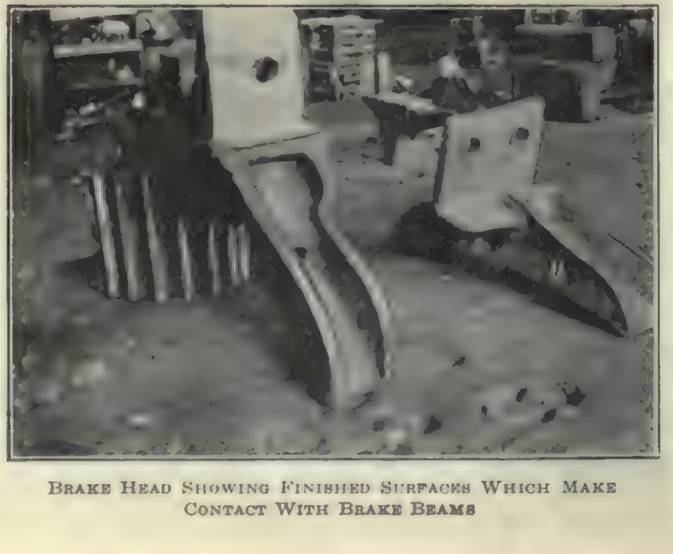


STEPS IN THE OPERATION OF FINISHING A BEARING
1. Boring mill for rough boring and grooving. 2. Halves of bearing rough bored and grooved. 3. Mandrel for holding bearing for rough and finish turning. 4. Chuck, boring bar and chuck bushing for finished boring and end chamfering. 5. Grinding machine for inside chamfering. 6. General view of bearing section, with trucks in foreground.



TRUCK PHOTOGRAPHS ARE NUMBERED TO PERMIT EASY IDENTIFICATION OF THE PARTS

The reclamation work "heads up" in the reclamation storeroom, entirely separate from the new materials storeroom. In charge of this is a specialist, who also has charge of the supply car. He is the general right-hand man to the shop foreman and is more than a mere stockroom clerk because he initiates changes in stock standards as necessary. All used material sent in from the carhouses is received here even if it is apparently of no further use. That which is fit for repairs or reclamation is distributed for repairs and checked off against the department to which it was sent. That which seems to be only fit for the scrap pile is brought to a central weigh scale, where it is further examined by a competent mechanic, who selects pieces that will serve for raw material or which can be put to further use for other purposes. The real scrap is then weighed according to account classification, so that each account receives proper credit. It is then loaded onto a suitable truck for conveyance to the stores scrap bins, where it is sorted and sold according to scrap market classification. Credit is thus given each account daily. Brass and copper scrap after being weighed is received daily by the stores department in locked containers and delivered to the contracting brass foundry by the carload at suitable intervals. Requisitions for supplies from carhouses are sent direct to this department and are filled as far as possible from reclaimed stock on "No Charge" invoices. Written requisitions are then forwarded to the stores department for new supplies. All work done on general repairs and reclamation is charged direct to the operating account affected as the work is being done. An interesting feature of this department is a series of classified bins in which are collected various small O.K. parts of damaged and scrapped apparatus. These are easily located and used to good advantage in the manufacture of new parts on manufacturing orders, all material for which is collected and issued by the material clerk.

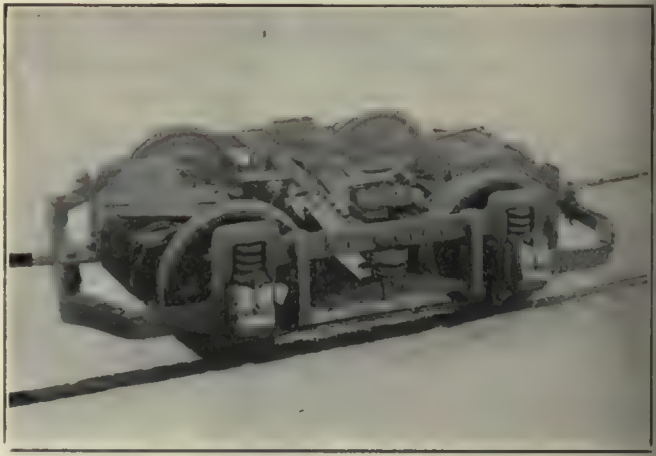


BRAKE HEAD SHOWING FINISHED SURFACES WHICH MAKE CONTACT WITH BRAKE BEAMS

### BEARING WORK INVOLVES INGENIOUS OPERATIONS

One of the most interesting sections of the shops is that devoted to bearings. This work is routed in accordance with the plan shown in an accompanying sketch. The machines involved are so placed that the work goes around the four sides of a rectangle, and trucks of convenient height, shown in a picture reproduced, are used to carry the raw material to the machines and the finished material back to stores. Tables are located between machines so as to eliminate all handling between machines. The steps in the work, which is a contract job, are as below:

1. The halves of the bronze bearings are first surfaced on the flat faces in a shaper at present, but a change-over to a milling operation is under way because a stout lathe left over from war work is available for this job.



A REMODELED TRUCK SHOWING WOOD COVERS OVER JOURNAL BOXES

2. Next comes a rough bore in a special boring machine in which the halves of the bearing are held in a stout clamp on a carriage sliding on the bed and controlled by a large hand wheel. At each end of the bar is a tool holder carrying tools for cutting a V-groove in each end of the bearing for use in supporting it during the next operation.

3. Next is the over-all rough and finish turning, in a lathe carrying a mandrel with V-ring clamps to engage the grooves mentioned above in true reference to rough bore.

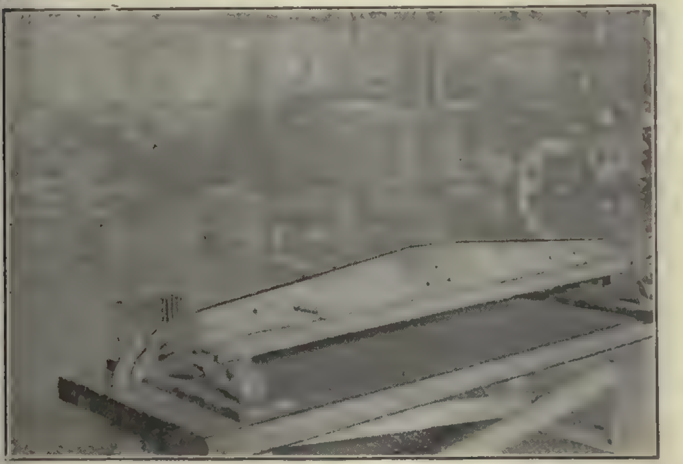
4. Then comes the finish bore in an excellent lathe inherited from war work. An extra stiff boring bar is used, and its inherent stiffness is reinforced by an anchorage at the rear end, not visible in the picture. In this operation the bearing is carried in a collet chuck, which revolves in a special bearing and which is furnished with split liners for the several types of bearing. These liners are split alternately from the two ends, as shown, so that they compress cylindrically in the chuck. The boring bar carries chamfering tools for rounding off the flanged end of the bearing, eliminating the V-groove there. The groove is allowed to

remain on the other end. The finish bore is made at high cutting speed, up to 200 ft. per minute and with fast feed, made possible by the stiffness of the lathe. The tolerance allowed in this bore is 0.002 in. above or under, which is possible because the chuck liner grasps the bearing uniformly over its entire length.

5. The final operation is the chamfering of the inside edges of the bearing halves, to permit the oil to flow onto the bearing surface. This is done on a special grinding table, through the surface of which projects a small emery wheel. On the front edge of the table is a stop which insures the proper angle and length for the chamfer.

As to costs of labor on contract on this bearing finishing, the following sample data will be of interest. With the men making 72 cents per hour, GE-203 axle bearings average about 47 cents for the job. GE-67 bearings average about 51 cents. During the war the figures reached as high as $1. Westinghouse-533 bearings cost about 50 cents. These prices are not as low as could be obtained if the work were steady. Bearing work is a "filling-in" job and hence is intermittent.

The tramways use 1,500 box-frame motors. These are overhauled on a regular schedule and need few emergency repairs. A section of floor is set aside for such repairs, which for five years past have been handled by two men in the general repair shops. The same men have done this work during the entire period and thus have become expert. The average shopping of the motors for such repairs is at two-year intervals and they make 75,000 miles in this period. No box-frame motor repairs are made elsewhere than in the general shops.



BRAKE BEAM WITH BRAKE HEADS RIVETED IN PLACE

Repair costs have been reduced and much noise eliminated by the use of impregnated wood covers, mounted by means of flat steel springs over the grease boxes. Paraffined wood clamp blocks for the motor leads have reduced grounding of leads to a minimum. On older types of motors the cast-iron cover over the commutator has been replaced by one of sheet iron, thus reducing weight, eliminating breakage and rendering the covers so easy to put on as to eliminate the temptation to leave them off. These covers have been used now for ten years.

Like the bearing section, the armature department has a rectangular layout, the stripping, winding, commutator connecting, etc., being done on the edge of the space. A trolley crane forms a belt line around the section, facilitating the transfer of armatures from point to point. Coil winding is done in the center of the space.

MOTOR WITH WOOD GREASE-BOX COVERS, MOTOR-LEAD CLEATS AND SHEET-IRON COMMUTATOR WELL COVER

Another section is devoted to compressor maintenance and each machine is overhauled every eighteen months. The period will be reduced in due course to twelve months. The Westinghouse and G.E.-CP-27 compressors are standard. When piston fits are first worn out the cylinder is relined and bored out 30 mils under size, the piston and rings being turned down to fit. A special jig is used for holding the rings during turning. On the second overhaul the cylinder is bored to standard size and a new piston and new rings are put in. As far as wear is concerned the rings are good for about ten years' life.

### TRUCKS BEING REBUILT AFTER NEARLY TWENTY YEARS

Many of the Tramways' cars are equipped with cast-steel trucks built locally between 1901 and 1905. These are now being thoroughly overhauled or, in fact, partly rebuilt. The pedestals are being relined with a steel channel section pressed out on the bulldozer. When journal-box guides cannot be machined to the new width they have strips welded in. Wood covers, impregnated, are being placed on the journal boxes. These are made of maple or other hardwood scrap at a cost of 30 cents each. Their use eliminates breakage and insures that the boxes are properly closed so as to keep out all water.

"CLOSE-UP" OF TRUCK PEDESTAL SHOWING DETAILS OF JOURNAL BOX COVERS, PEDESTAL LINING, ETC.

A most important improvement is the finishing of the surface of the brakeheads which make contact with the brake beams and the riveting of these in place instead of bolting. The life of brakeheads has thus been prolonged five times, due to the permanently rigid connection. Troubles in service have been lessened and maintenance costs have been reduced to a large extent. The additional work necessary has thus more than paid for itself.

A plan has also been worked out for replacing worn metal in the ball-and-socket joint of Brill brake hangers. A steel liner of spherical form and $\frac{1}{16}$ in. thick is pressed into the socket, where friction holds it. The liners are pressed out hot in the bulldozer. When the ball is worn it is reshaped in a clean die, and if it is much worn a patch $\frac{1}{4}$ in. to $\frac{3}{8}$ in. thick, according to the wear, is worked in behind it. By this plan the life of the hanger is extended about two years each time it is relined.

Another useful kink in truck maintenance is the furnishing of photographic prints of trucks for the use of maintainers on which each item is numbered to correspond with an accompanying key. This eliminates confusion as to what part is meant when an order is given or a record made.

### SOME OTHER POINTS IN THE SHOPS WHICH ATTRACT ATTENTION

In shops as large as those at Youville there are many sundry practices, some of which are wholly or partly novel. No attempt has been made here to list these. Among them is the winding of heater coils with the aid of a home-made machine shown in one of the illustrations.

Another point is the use of the bulldozer, which has been mentioned several times. Work for this machine is allowed to accumulate and experts put through the jobs in batches. About two days per month suffice at present.

In painting savings are being made by eliminating unnecessary operations with the idea that a coach finish is not required. While simple striping is still retained, it, as well as the numbering and lettering, is done with yellow paint instead of gold leaf as formerly used. The cars are kept unusually well painted, as part of the general and continuous advertising campaign of the company.

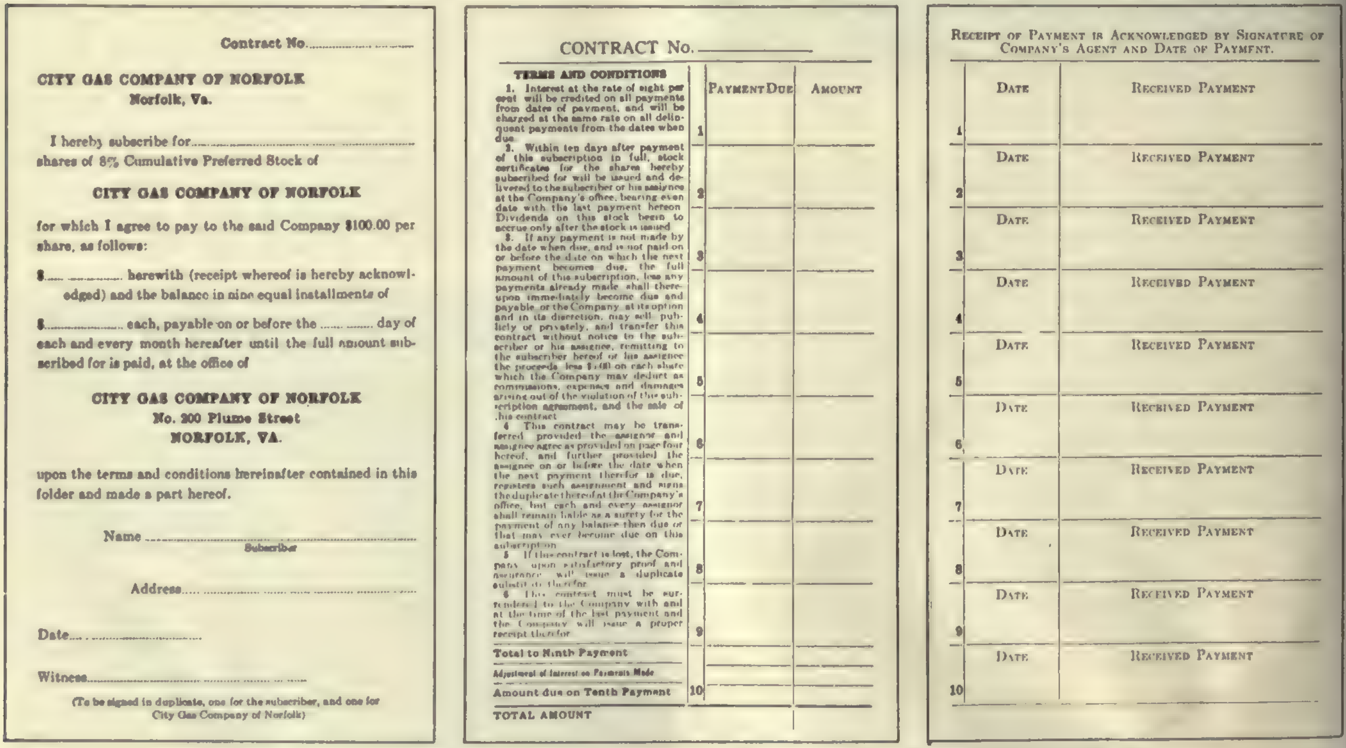
## Security Sales to Customers

### As a Result of a Plan Followed by the City Gas Company of Norfolk, Many of Its Customers Are Now Also Security Holders

ONE of the elements of making purchase of utility securities attractive to the public is to make such purchase on some easy method of payment. To do this the City Gas Company of Norfolk, a subsidiary of the Virginia Railway & Power Company, has adopted a method which is proving successful.

Eight per cent cumulative preferred stock is offered to the public at $100 per share, payable in ten monthly installments. Many of the usual difficulties attendant upon such an installment plan of paying for stocks are avoided by what practically amounts to a card catalog system. The accompanying illustration shows the three useful sides of the card catalog folder and is practically self-explanatory. This is issued in duplicate; one is given to the subscriber and one remains in the files of the City Gas Company and record is made at the time of payment of each installment. This payment is made easier in the case of gas companies on account of the fact that many patrons come to the office of the company to pay their bills monthly, but the system is certainly applicable to railway use as well.

Reports from Norfolk indicate that the plan has been very successful and that a satisfactorily large amount of preferred stock has at the present time been purchased by customers.



Contract No. ..................

**CITY GAS COMPANY OF NORFOLK**
**Norfolk, Va.**

I hereby subscribe for .................................. shares of 8% Cumulative Preferred Stock of

**CITY GAS COMPANY OF NORFOLK**

for which I agree to pay to the said Company $100.00 per share, as follows:

$.................. herewith (receipt whereof is hereby acknowledged) and the balance in nine equal installments of

$.................. each, payable on or before the .............. day of each and every month hereafter until the full amount subscribed for is paid, at the office of

**CITY GAS COMPANY OF NORFOLK**
**No. 200 Plume Street**
**NORFOLK, VA.**

upon the terms and conditions hereinafter contained in this folder and made a part hereof.

Name .................................................
Subscriber

Address .................................................

Date ..............................

Witness ..............................................

(To be signed in duplicate, one for the subscriber, and one for City Gas Company of Norfolk)

CONTRACT No. ____________

**TERMS AND CONDITIONS**

1. Interest at the rate of eight per cent will be credited on all payments from dates of payment, and will be charged at the same rate on all delinquent payments from the dates when due.

2. Within ten days after payment of this subscription in full, stock certificates for the shares hereby subscribed for will be issued and delivered to the subscriber or his assignee at the Company's office, bearing even date with the last payment hereon. Dividends on this stock begin to accrue only after the stock is issued.

3. If any payment is not made by the date when due, and is not paid on or before the date on which the next payment becomes due, the full amount of this subscription, less any payments already made shall thereupon immediately become due and payable or the Company at its option and in its discretion, may sell publicly or privately, and transfer this contract without notice to the subscriber or his assignee, remitting to the subscriber hereof or his assignee the proceeds less $1.00 on each share which the Company may deduct as commissions, expenses and damages arising out of the violation of this subscription agreement, and the sale of this contract.

4. This contract may be transferred provided the assignor and assignee agree as provided on page four hereof, and further provided the assignee on or before the date when the next payment therefor is due, registers such assignment and signs the duplicate thereof at the Company's office, but each and every assignor shall remain liable as a surety for the payment of any balance then due or that may ever become due on this subscription.

5. If this contract is lost, the Company upon satisfactory proof and assurance will issue a duplicate substitute therefor.

6. This contract must be surrendered to the Company with and at the time of the last payment and the Company will issue a proper receipt therefor.

| | Payment Due | Amount |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| Total to Ninth Payment | | |
| Adjustment of Interest on Payments Made | | |
| Amount due on Tenth Payment 10 | | |
| TOTAL AMOUNT | | |

RECEIPT OF PAYMENT IS ACKNOWLEDGED BY SIGNATURE OF COMPANY'S AGENT AND DATE OF PAYMENT.

| | Date | Received Payment |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

TYPE OF CARD CATALOG CONTRACT USED BY CITY GAS COMPANY OF NORFOLK
At left, form of contract to be filled out and signed by customer. In center, terms and conditions that govern.
At right, receipt card for recording payments as made.

# Traffic and Housing in Large Cities*

### The Connection Between the Two Is Close—Local Conditions Will Increase or Decrease the Annual Rides per Inhabitant—Definite Relation Found Between Track and Building Development Within Different Areas Equidistant from a City Center

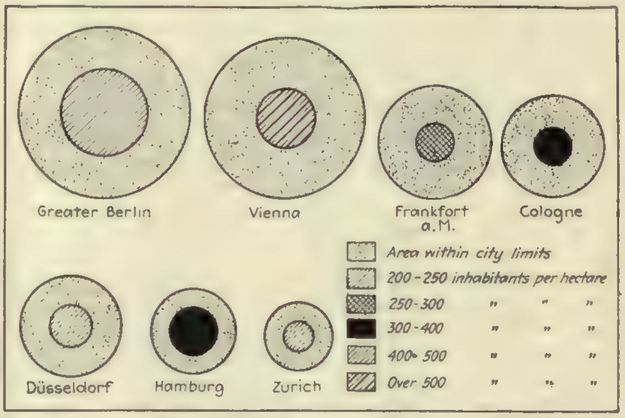
BY DR. ARTHUR ERTEL
Secretary Internationale Strassenbahn und Kleinbahn Verein, Vienna

THE question of housing in cities of more than 100,000 inhabitants today is largely a transportation question. The recent economic conditions, the effect of the eight-hour day and the increased prices of construction materials have greatly affected the street railways, and the higher fares which they have been obliged to charge have cut down the traffic between the residential districts and industrial centers. In fact, it is impossible to foresee when there will be a return of normal conditions to the railways, although that they ultimately will recover there is no doubt any more than that the entire state will be brought back to normalcy in due time.

Studies of the relation between housing and transportation are of value only if a very large number of individual cases is investigated and if proper care is taken for the further development of each railway system.

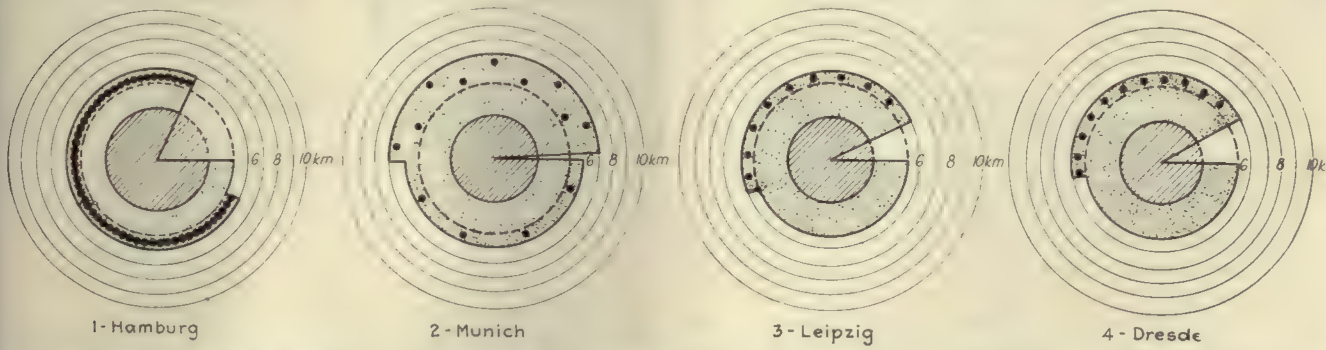
The city of the future will differ materially from that of the present with its closely built up and congested central area,† so that wrong conclusions will be drawn if present experiences are used without modification as a basis for predicting the traffic of the future. Future city development will be characterized by a much more extensive use of the small single-family house with gardens and much more open space. The large factories to which and from which large numbers of working people flow rythmically will stay as they are.

The new means of city transportation will have to be fast, and the fares must be in accordance with the means of the users. At present this cannot be accomplished, but we all have as our goal the final restoration of normal times. In the meantime, the number of transportation means has largely increased. As the greatest competitor to the street railways the automobile has already to be considered, and the airplane may follow soon.



GRAPHICAL REPRESENTATION OF SIZE OF CITY, AREA OCCUPIED BY BUILDINGS AND DENSITY OF POPULATION

The outer circle shows the size of the city, the inner circle the area occupied by buildings and the shading of the inner circle the population density.



GRAPHICAL REPRESENTATION OF AREA AND DISTRIBUTION OF POPULATION BEYOND THE 5-KM. RADIUS

The smallest circle shows the built-up area, each dot in the shaded portions beyond the 5-km. circle indicates 1,000 population, the open sectors indicate arrested expansion due to natural obstructions, like a body of water, or the proximity of a community under different political control. These sectors are, for Hamburg, 17%; Munich, 1%; Leipzig, 6.7%; Dresden, 7.8%.

Recent developments in electric roads have not in all cases been particularly fortunate. In some cases too much red tape and supervision by incompetent authorities have been a handicap, and in many other cases the street railway has imitated too closely its bigger brother, the steam railroad, by installing far too heavy rolling stock. As far as fare systems are concerned, we are today only at the beginning. We cannot expect good results if every passenger has to pay uniformly for the distance traveled. If we make the long-distance city fare proportionately too low the urban traveler has to make up for it. If we ask both classes of passengers to pay proportionally to the distance traveled we shall lose the commuter. Two ways have been suggested to solve this problem. One which was advocated ten years ago has now little chance of realization; that is, to give free transportation to every resident and to cover expenses by taxes. The other is to defray part of the expense of building and operation of

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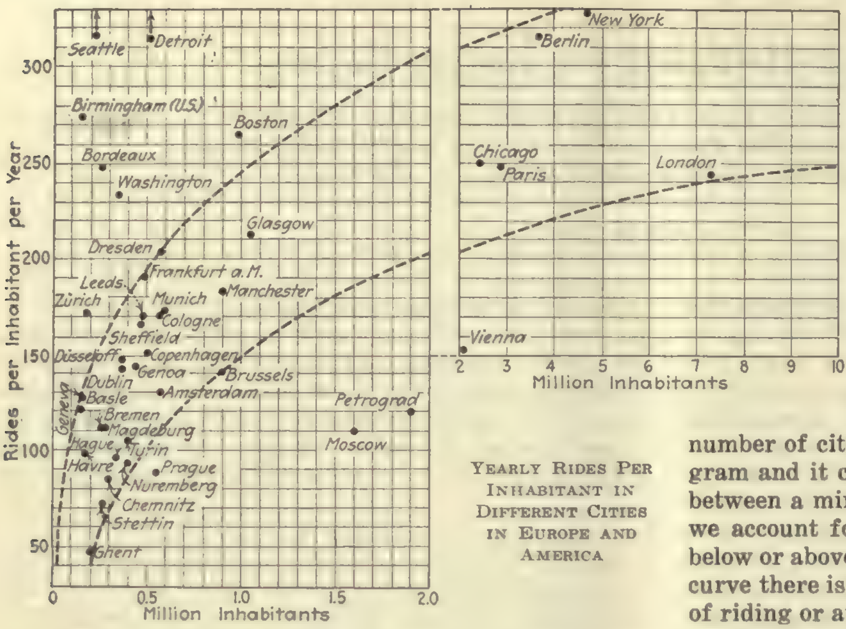
*Abstracted from *Verkehrstechnik*, May-June, 1921.

†EDITOR'S NOTE: Dr. Ertel is speaking primarily, of course, of the older European cities, where this condition prevails to a much greater extent than in the average American city.



YEARLY RIDES PER INHABITANT IN DIFFERENT CITIES IN EUROPE AND AMERICA

TABLE SHOWING POPULATION AND RIDES PER INHABITANT IN LARGE CITIES

| | Population in Millions | Rides per Inhabitant per Year |
|---|---|---|
| **Germany** | | |
| Berlin | 3 708 | 315 |
| Munich | 0.596 | 173 |
| Dresden | 0 576 | 205 |
| Cologne | 0 572 | 170 |
| Frankfort | 0 487 | 191 |
| Nurnberg-Furth | 0 400 | 93 |
| Düsseldorf | 0 371 | 149 |
| Chemnitz | 0 297 | [illegible] |
| Madgeburg | 0.278 | 112 |
| Bremen | 0 269 | 111 |
| Stettin | 0.258 | 72 |
| **England** | | |
| London | 7 312 | 244 |
| Glasgow | 1.050 | 212 |
| Manchester | 0 900 | 184 |
| Leeds | 0 484 | 170 |
| Sheffield | 0 470 | 167 |
| Dublin | 0.380 | 143 |
| **Former Austria** | | |
| Vienna | 2 030 | 154 |
| Prague | 0 552 | 89 |
| **Belgium and Holland** | | |
| Brussels | 0 900 | 141 |
| Ghent | 0 209 | 48 |
| Amsterdam | 0 573 | 123 |
| Hague | 0 321 | 97 |
| **America** | | |
| New York | 4 767 | 321 |
| Boston | 1.099 | 266 |
| Detroit | 0.515 | 377 |
| Washington | 0 343 | 236 |
| Seattle | 0.237 | 437 |
| Birmingham | 0.150 | 277 |
| Chicago | 2.447 | 250 |
| **France** | | |
| Paris | 2.822 | 249 |
| Bordeaux | 0.262 | 258 |
| Amiens | 0.093 | 71 |
| Havre | 0.177 | 99 |
| **Italy** | | |
| Genoa | 0.440 | 145 |
| Turin | 0.400 | 105 |
| **Russia** | | |
| Petrograd | 1 907 | 120 |
| Moscow | 1 600 | 110 |
| **Denmark** | | |
| Copenhagen | 0.509 | 151 |
| **Switzerland** | | |
| Zurich | 0 188 | 172 |
| Basel | 0.155 | 129 |
| Geneva | 0 154 | 122 |

the roads by a special assessment upon the real estate owners of the communities served. However, it is useless to discuss the fare questions until our (German) wages and material costs have become stabilized.

In 1910 Germany contained forty-eight cities with a population of 13.8 millions, or 21.3 per cent of the total population lived in cities of this size. It is of importance to determine the relation of area of city, total buildings-covered area, and density of population. The first diagram shows this graphically for seven large cities. (Berlin, Frankfort a/M, Cologne, Düsseldorf and Hamburg in Germany, Zürich in Switzerland and Vienna in Austria.)

Provided there are no lateral restrictions, the most natural development of a city is radial; that is to say, the city tends to take the circular form. Most large cities have exceeded their 5-km. (3-mile) radius, and some of them extend already beyond their 10-km. (6-mile) radius. It happens frequently that the center is so eccentrically located that communities under a different political control reach into the city area proper. To how much this amounts is graphically shown in the second diagram, where it is represented by sectors graduated by degrees. This diagram shows also the number of city residents located outside the 5-km. radius (each black circle representing 1,000 inhabitants). From 1871 to 1910 the total area occupied by German cities increased 210 per cent.

It is customary to judge the traffic of a city by the number of yearly rides per inhabitant. In general, this gives a fairly truthful picture of actual conditions. In some cases, however, additional facts to understand the data are necessary. The third engraving gives these values for a number of cities in Europe and America in a target diagram and it can be seen that practically all points come between a minimum and maximum curve. But how can we account for the considerable number of cities lying below or above the curves? In cities below the minimum curve there is no doubt either a less-pronounced necessity of riding or an extensive use of transfer tickets. Not so easy is the explanation of the many cities above the upper curve, which comprise cities of quite limited size and especially American cities. No doubt the large areas of such places like Boston, Detroit, Washington, Chicago, etc., account largely for this large number of rides.* It is to be regretted that no more data are available for this investigation, but many spread-out European cities also show high traveling rates.

## CHARACTERISTIC CURVES OF CITIES ANALYZED

For the more accurate investigator these general figures are, however, not precise enough, and he has to investigate more closely the individual cases.

The largest German city, Berlin, is not suitable for such an investigation, as it represents the conglomeration of several previously independent political subdivisions, which had, and to a certain degree still have, their own community centers and consequently their centers of traffic. Cities like Vienna, Munich, Düsseldorf, Cologne and Zürich have been more closely investigated by the author. The results of Vienna and Cologne are given on this and the following page.

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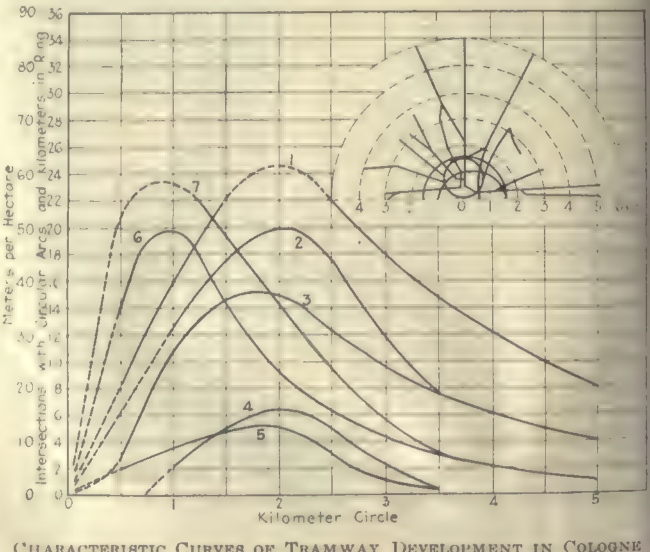
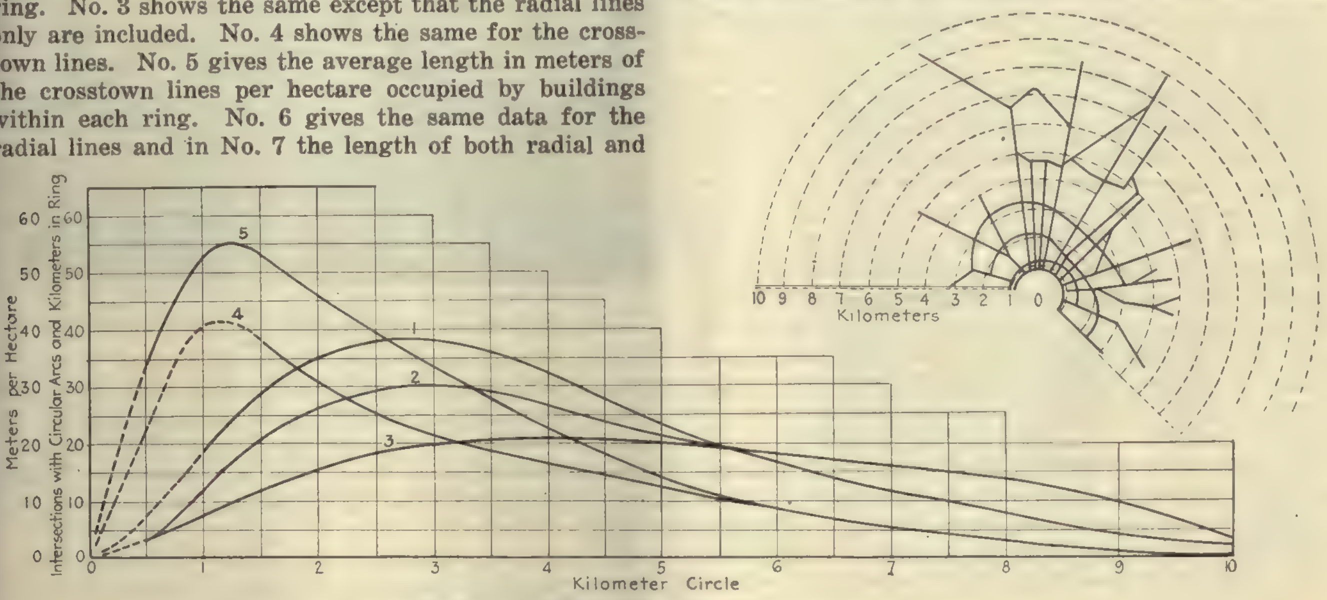
[*EDITOR'S NOTE: In some cases also, probably, the figures for population have been taken from the census reports for the central city and represent a smaller number of people than those actually tributary to the railway.]



CHARACTERISTIC CURVES OF TRAMWAY DEVELOPMENT IN COLOGNE

The upper right-hand drawing in each case is a chart of the greater part of the city included within the circular arcs drawn. The entire system is not shown in either case, because of the intersection of each city by a river, the Rhine in the case of Cologne and the Danube in the case of Vienna. In consequence, a sector of 180 deg. in the case of Cologne and of 225 deg. in the case of Vienna, is given and contains the significant routes. The lines are drawn from a radial point, which in Cologne is the Heumarkt and in Vienna is Stefansplatz. These are not the heaviest points of traffic, but are taken as the logical radiating point in each case.

In the lower left-hand portion of the diagram representing conditions in Cologne are curves giving the following data as they occur within the ½-km. rings around this radial point. No. 1 shows the number of intersections of radial street railway lines with each ½-km. arc. No. 2 shows the length measured in kilometers of both radial lines and crosstown lines within each circular ring. No. 3 shows the same except that the radial lines only are included. No. 4 shows the same for the crosstown lines. No. 5 gives the average length in meters of the crosstown lines per hectare occupied by buildings within each ring. No. 6 gives the same data for the radial lines and in No. 7 the length of both radial and crosstown lines are included. In the case of the chart for Vienna there are only five curves. No. 1 shows the number of intersections of radial lines with each ½-km. arc. No. 2 shows the length in kilometers of both radial and crosstown lines within each circular ring. No. 3 shows the same except the radial lines only are included. No. 4 gives the average length in kilometers of radial lines on each hectare occupied by buildings within the ring, and No. 5 gives the average length in kilometers of both radial and crosstown lines for each hectare occupied by buildings in each ring.



CHARACTERISTICS CURVES OF TRAMWAY DEVELOPMENT IN VIENNA

To compensate for abnormal values due to river area within the city in each case, the river areas have been calculated as being of the same density of population as the remainder of the city.

The regularity of the curves so plotted from the data so obtained, not only for these cities but for the other cities investigated, was surprising. The other cities considered were Munich, Düsseldorf and Zürich, and the curves in all were of the analytical character of

$$(X^2 + a)Y = bX$$

Even the values of $a$ and $b$ showed a surprising regularity which permits of the conclusion that further developments based upon these rules will lead to the solution of future economical traffic problems.

## Coal Consumption by Users

THE Geological Survey of the Department of the Interior has recently made public the following summary of information on coal consumption in the United States. The department points out, in this connection, that consumption is not the same as production. Not only must exports and imports of coal be taken into consideration, but the flow of coal in and out of storage must be reckoned with. Further, there is great variation in the quantity of coal actually consumed from year to year, depending to some extent on the weather and to much greater degree on the activity of the industries which are the chief consumers of coal.

The proportion of the total coal consumed, taken by different industries, does not vary so greatly, and the percentages shown in the table below are roughly constant from year to year. The table represents in a general way the conditions during 1917, a year of large consumption. The principal changes since 1917 have been an increase in the proportion exported and a transfer of some millions of tons from beehive to by-product coke. The proportion consumed by the two types of coke ovens combined has undergone little change.

COAL CONSUMED IN THE UNITED STATES AND EXPORTED

(The figures for bituminous coal in this table represent in somewhat generalized form the calendar year 1917; those for anthracite, the coal year ended March 31, 1917.)

| | Quantity, (Net Tons) | Per Cent |
|---|---|---|
| Bituminous coal: | | |
| Industrial plants | 174,600,000 | 31.7 |
| Public utilities: | | |
| Electric | 31,700,000 | 5.8 |
| Gas | 4,960,000 | 0.9 |
| Railroads | 153,700,000 | 27.9 |
| Domestic consumers | 57,100,000 | 10.3 |
| Power and heat at mines | 12,100,000 | 2.2 |
| Exports | 22,900,000 | 4.1 |
| Bunkers: | | |
| Foreign trade | 6,700,000 | 1.2 |
| Coastwise and lake trade | 3,600,000 | 0.7 |
| Beehive coke | 52,240,000 | 9.5 |
| By-product coke | 31,500,000 | 5.7 |
| | 551,100,000 | 100.0 |
| Anthracite: | | |
| Domestic consumers (domestic sizes) | 49,400,000 | 55.1 |
| Artificial gas plants | 1,650,000 | 1.8 |
| Steam trade (industries, power plants and heating large buildings) | 18,450,000 | 20.5 |
| Railroad fuel | 6,400,000 | 7.1 |
| Power and heat at mines | 9,350,000 | 10.4 |
| Exports | 4,600,000 | 5.1 |
| | 89,850,000 | 100.0 |
| Grand total | 640,950,000 | |

# The Imperial Omnibus in Service

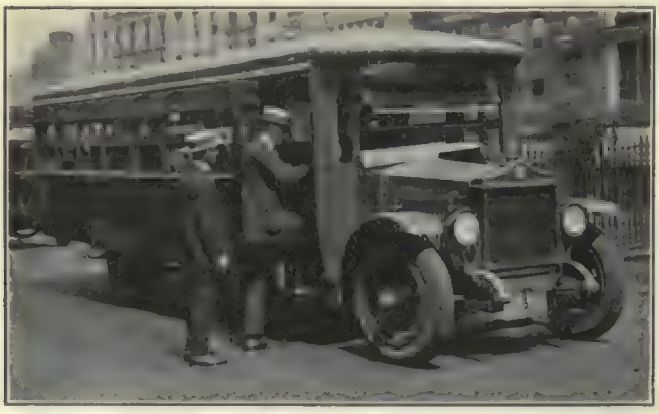
**Trial Tests Being Made in Actual Service on One of New York's 5-Cent Bus Lines—Takes Well with the Riding Public and City Officials**

THE Trackless Transportation Company of New York, the originator of the low center of gravity, underslung, stepless bus, has recently put one of these motor cars into service on the bus routes in downtown New York which are operated under the control of the department of plant and structures of the city. On this route there are many other types of motor buses but none of them are like this one in design. By means of actual service tests the company will soon be able to know what can be expected of the new bus under actual operating conditions.

The motor bus is of a new type and has been especially designed for passenger service. Some of the factors sought are maximum of safety and comfort to passengers, low cost of maintenance and economy of operation.

The bus, as shown in the accompanying illustrations, has a low underslung body, with the floor but 26 in. above the level of the street. The entrance is at the right forward end, is spacious and has but one step. This allows ready egress and ingress of passengers with a minimum of delay. The bus has a seating capacity of twenty-nine, on four cross seats on either side, two longitudinal seats over the rear wheels and a seat across the rear of the body large enough to accommodate five passengers. Standees to the number of twenty can be accommodated, and this gives a maximum load of forty-nine passengers. An emergency door is provided at the rear. The windows are raised sash and when opened cause a wire guard to slide into place, thereby rendering it impossible for a passenger to put out his arms or head.

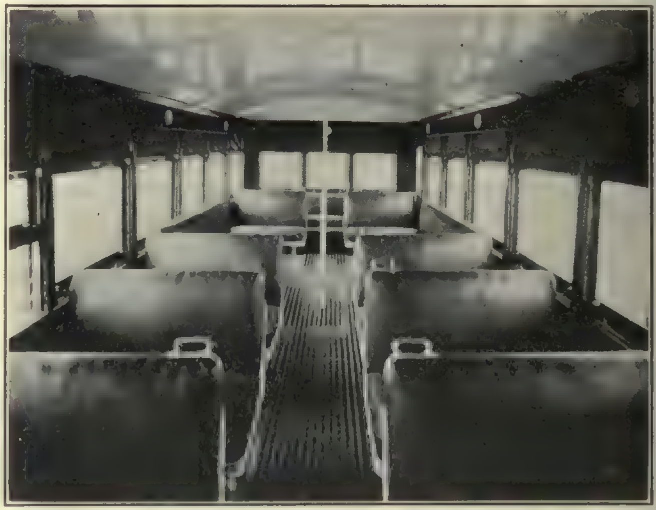
The body is of steel-aluminum construction and was built by the Kuhlman Car Company, Cleveland. It is of the truss side type, with the lower member a structural steel angle and the top member a pressed steel letter-board. The posts are of pressed steel and the roof is of Haskelite. The interior finish is of birch, stained mahogany color with a white enamel roof. Illumination is furnished by seven dome lights. There is also a step light and light for an illuminated destination sign. Three exhaust ventilators are provided, mounted along the center line of the roof. Another ventilator is mounted on the dash of the bus.



EXTERIOR OF MOTOR BUS SHOWING LOW FLOOR AND ENTRANCE WITH ENCLOSED STEPS

The chassis frame is of special design and of a channel section. A special Buda engine of the *ETU* type, with Fuller transmission and Clark internal drive rear-end specially designed make up the power plant. The transmission has four speeds forward and is mounted amidships. It has gears of very wide face.

The rear axle carries 65 per cent of the total weight. The chassis weights approximately 5,000 lb. The rear springs, which are of the compensating type, are 60 in. in length and are hung below the axle. The front axle is of the drop construction type with spring pads forged on the top face in the dropped position. This spring arrangement, using springs of elastic furnace chrome silico manganese steel, together with giant pneumatic tires gives very easy riding qualities and provides a maximum of comfort for the passengers. It is possible to substitute cushion type tires for pneumatic tires where desired, which would reduce height of floor about 2 in.



INTERIOR LOOKING TOWARD THE REAR, SHOWING SEATING ARRANGEMENT

The chassis as equipped has an electric starting and lighting system, speedometer, power tire pumps, fire extinguisher and motometer. There are two forms of brakes. One is a service brake, which is of the propeller shaft-locomotive type that works on the drive shaft; the other is an emergency internal expanding brake on the rear axle.

Two wheel gages are used. The rear wheels are placed 71 in. apart in order to reduce to a minimum the chance of overturning. The front gage is 66½ in. which is desirable in order to give as small a turning radius as possible. The wheelbase is 183 in.

# Less than 7 per Cent of Average Family Income Goes for Utility Services

LESS than 7 per cent of the average yearly income of Ohio families is spent for public utility service according to figures compiled by the Department of Home Economics of Ohio State University. This compilation shows that the actual amount spent in 1920 by the average family having an annual income of $1,500 to $6,000 for the services of the utility companies was only 6.49 per cent of the total income.

The families included in the survey spent 1.01 per cent of their income for electricity, 2.27 per cent went for street-car rides, 1 per cent for telephone service and 2.45 per cent for gas.

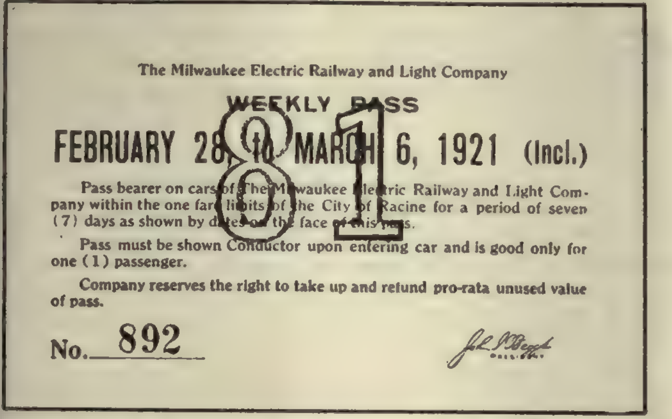
# The Weekly $1 Pass in Wisconsin

## Experience in Racine and Kenosha Indicates Useful Field for This Method of Encouraging Off-Peak Riding—Pass-Holders Take Nearly Four Rides a Day—Simplification of Fare Collection Results from Use of Pass

BY WALTER JACKSON
Consultant

THE Jan. 3, 1920, issue of the ELECTRICAL RAILWAY JOURNAL described the "Unlimited-Ride, Transferable Weekly Pass at Racine" inaugurated Aug. 18, 1919. The management, the Milwaukee Electric Railway & Light Company first introduced this pass before the safety cars were installed in Racine, so that now the plan has been tried and has worked on both two-man and one-man cars. As the associated Wisconsin Gas & Electric Company adopted a similar plan on Jan. 24, 1921, in Kenosha it seems opportune to discuss the nearly two years' experience of the Racine lines.

It is not necessary to repeat in detail the reasons for introducing a form of transportation which, theoretically, allows unlimited riding for $1 per week. Stress should be put upon the fact, however, that, unlike the passes developed on European street railways, the cost is such that the holder would be paying more than the cash or general ticket rate if he did not take more than two rides a day. Therefore, the idea of this pass is not to give a reduction to the usually compulsory peak-hour rider but to the usually voluntary off-hour rider.



The Milwaukee Electric Railway and Light Company

WEEKLY PASS

FEBRUARY 28, to MARCH 6, 1921 (Incl.)

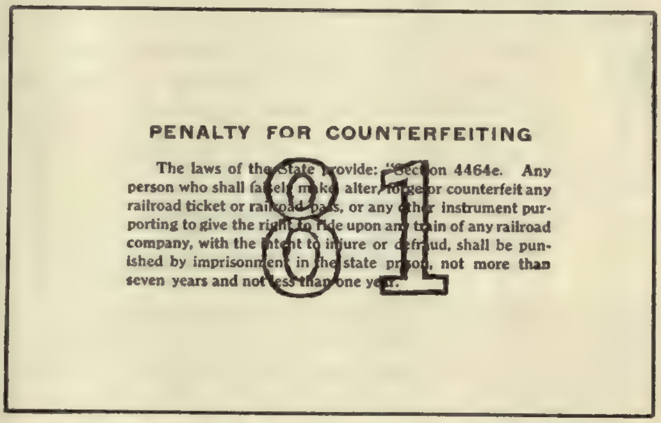
Pass bearer on cars of The Milwaukee Electric Railway and Light Company within the one fare limits of the City of Racine for a period of seven (7) days as shown by dates on the face of this pass.

Pass must be shown Conductor upon entering car and is good only for one (1) passenger.

Company reserves the right to take up and refund pro-rata unused value of pass.

No. 892

FACE OF PASS SHOWING MARKINGS FOR CONDUCTOR'S CONVENIENCE



PENALTY FOR COUNTERFEITING

The laws of the State provide: "Section 4464e. Any person who shall falsely make, alter, forge or counterfeit any railroad ticket or railroad pass, or any other instrument purporting to give the right to ride upon any train of any railroad company, with the intent to injure or defraud, shall be punished by imprisonment in the state prison, not more than seven years and not less than one year."

REVERSE SIDE ON WHICH CONDITIONS OF USE ARE PRINTED

In practice, the pass acts exactly as if fares were being charged on a distance basis. The holder who lives close in may take luncheon rides regularly, whereas the holder who lives near the end of the line will not do so because of time limitations. Similar limitations may occur in connection with evening travel. Hence, in the long run, each holder tends to get about the same mileage despite differences in the number of rides.

### PASS-HOLDERS TAKE NEARLY FOUR RIDES A DAY

Knowledge of pass experience in foreign cities with length of routes comparable to Racine anticipated an average of four rides per business day. This has been confirmed by two checks taken a long time apart. For the week ended Nov. 7, 1919, it was found that the average number of rides per pass-holder on a weekday was 4.1 and for Sunday, 2.4, including rides normally transfers. For the week ended Jan. 16, 1921, the average number of rides reduced to a revenue basis was 26.5 or slightly less than four a day. In attaining the latter figure, the company assumed that 15 per cent of the gross rides counted were transfers, this being the transfer proportion of the other traffic. This means that the patrons who take as many off-peak rides as they do rush-hour rides (since it is practically impossible to take four rides during rush hours) average a fare somewhat less than 4 cents.

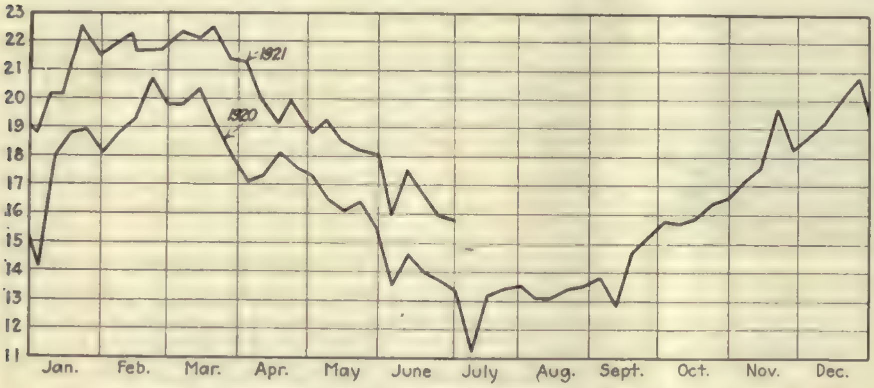
In contrast to this, it may be pointed out that when the pass was instituted, the fares were 6 cents cash with five tickets for 30 cents, good at all hours of the day, and a 5½-cent ticket (ten tickets for 55 cents), good for transportation between the hours of 6 and 8 a.m. and 5 and 7 p.m. On Nov. 23, 1919, about three months after the installation of the weekly pass, these rates were increased to 7 cents and six tickets for 35 cents, at all hours of the day. Even with the so-called workmen's tickets abolished, the pass had to compete with a reduced rate ticket. This fact has doubtless kept down the purchase of passes, which require a dollar's initial outlay instead of 35 cents.

Reducing the matter to terms of revenue rather than rides, we find that the pass-holder yields, say, 16 cents a day, while the cash rider probably does no better than 14 cents. The ticket rider yields still less except for his occasional extra ride. If the ticket rider averaged three rides a day or more it would, of course, be to his interest to purchase a pass.

In this connection, the point has been raised whether or not the transferable feature leads to much splitting in the use of the pass. A little thought should show that this is rarely practicable from purely physical reasons. A holder of the pass necessarily cannot give it to another until he has returned from his journey. Such splitting as does occur is carried on among clerks who have successive luncheon periods, but even here the plaints of the downtown restaurant keepers bear witness to the fact that these clerks formerly patronized the nearby lunchroom instead of riding home. Another opportunity for splitting the use of passes lies in their use by housewife and children, but this is encouraged rather than discouraged because it creates voluntary customers. Aside from this, children would enjoy the lowest ticket rate in any case.

### ONE-THIRD OF REVENUE PASSENGERS HAVE NO PHYSICAL TRANSACTION WITH THE CAR OPERATOR

During the first week's (August, 1919) use of the pass, the sales ranged from 818 to 964 a week and the percentage of revenue was 10.2 per cent in the case of the larger sales figure. Furthermore, during the week ended Aug. 24, when 818 passes were sold, there was a drop of 1.5 per cent in revenue compared with the preceding non-pass week. This might be explained by the natural assumption that the first buyers would largely be those whose concerns led them to ride more than usual. The next month saw the sale of passes exceed the 1,000 mark, and thereafter revenue increased steadily in comparison with like periods. It is not asserted that the pass caused these enhancements of revenue. During the year following its installation Racine was an increasingly busy community.



SEASONAL FLUCTUATIONS IN SALE OF WEEKLY PASSES, IN HUNDREDS

In September and October, 1920, came faster and more frequent service through the use of the safety cars on all base schedules. This improvement stimulated traffic further. Thus it was that while only 1,128 passes were sold the week ended Sept. 28, 1919, a total of 1,528 passes were sold the week ended Sept. 26, 1920. Late in 1920 Racine's industries began to suffer, but, curiously enough, the pass sales kept climbing, the week ended Dec. 26, 1920, showing 2,080, against the previous comparable Christmas shopping week of 1919, when 1,602 passes were sold. The week ended Dec. 21, 1919, was high water mark for that year, with a sales of 2,055. For the months of January and February, 1920 and 1921, the sales compare as follows:

| 1920 Week Ended | | 1921 Week Ended | |
|---|---|---|---|
| Jan. 4 | 1,413 | Jan. 2 | 1,880 |
| Jan. 11 | 1,796 | Jan. 9 | 2,046 |
| Jan. 18 | 1,879 | Jan. 16 | 2,074 |
| Jan. 25 | 1,889 | Jan. 23 | 2,255 |
| Feb. 1 | 1,813 | Jan. 30 | 2,148 |
| Feb. 8 | 1,876 | Feb. 6 | 2,177 |
| Feb. 15 | 1,932 | Feb. 13 | 2,219 |
| Feb. 22 | 2,069 | Feb. 20 | 2,163 |

One of the interesting observations during the present industrial depression is the tendency toward the purchase of passes by those who are seeking work, or perhaps striving to kill time by visiting. The possession of an unlimited-ride pass seems to give them a lot more satisfaction than if they were to spend an equal amount of money for fewer rides.

A most intensive survey would probably be needed to reveal just how much extra revenue is due to the use of passes. This is impracticable, so only the unquestioned benefits will be studied. First, the fact that today approximately 32 per cent of the revenue passengers are pass-holders. This means that one-third of the riders do not call for any more exertion on the part of the car operator than a glance at the color and inch-high numerals of the pass. These riders have but one cash transaction a week (when they purchase the pass) and they never demand or have arguments about transfers. As all but 22 per cent of the total revenue passengers present some form of ticket fare, it is obvious that the operation of safety cars in Racine is close to the ideal as regards their most mooted point, namely: slowness in fare collection.

For the first three or four months following the installation of the pass it was customary for the conductor to ring up on an overhead register each pass presentation, the cash and metal token fares going into a registering farebox. Following a shift in equipment which placed in service in Racine cars which happened to be without such registers, the company concluded that the experience gained made it unnecessary to count pass riders. The two surveys mentioned have shown that the multiplication of the number of passes sold by four gives a sufficiently accurate estimate of the number of riders. The other revenue passengers, as hitherto, continue to drop their fares in the box.

A second advantage is that the car operator and the pass rider have a minimum of friction in their relations. The pass-holder also has the cheerful feeling that any car is his car any time. He comes as close to regarding the car as his personal vehicle as it is possible to make a public conveyance. It is only human nature for him to ride much shorter distances than if he paid separately for each ride, and thus he acquires willingly a most desirable habit.

### SALES IN 1921 GREATER THAN IN 1920

So successful has been the combination of one-man car and weekly pass that it has offset to a pleasingly large extent the losses that must be expected during the present depression. Each has done its share toward popularizing the service with both the public and the car operators.

An examination of the sale of passes throughout any extended period will show fluctuations of 50 to 90 per cent. Without going into details it may be stated that weather conditions favoring automobiles, factory inventory periods, holiday weeks, holiday shopping time, and the opening and closing of schools are the chief factors. School children are large users of the pass since it enables them to go home for lunch and to do more riding when visiting their friends. Nor is it a bad idea to foster the car-riding habit at the most impressionable time in the automobile era.

The latest figures from Racine show pass sales to be 15 to 20 per cent ahead of the same period of 1920. The actual sales in 1921 were:

| Week Ended: | | Week Ending | |
|---|---|---|---|
| Feb. 27 | 2,169 | May 8 | 1,914 |
| March 6 | 2,222 | May 15 | 1,848 |
| March 13 | 2,206 | May 22 | 1,821 |
| March 20 | 2,249 | May 29 | 1,804 |
| March 27 | 2,131 | June 5 | 1,595 |
| April 3 | 2,129 | June 12 | 1,756 |
| April 10 | 1,986 | June 19 | 1,680 |
| April 17 | 1,917 | June 26 | 1,599 |
| April 24 | 1,986 | July 3 | 1,581 |
| May 1 | 1,882 | | |

In conclusion, it may be stated that the turn for the better has not yet reached Racine. Another hindrance to traffic since April 8, 1920, is the reconstruction of the State Street bridge, which has had the effect of cutting off considerable revenue.

### ENCOURAGING THE SHORT-HAUL AND OFF-PEAK RIDER IN KENOSHA

The Kenosha lines of the Wisconsin Gas & Electric Company may be said to require traffic encouragement even more than Racine. While Racine has a population of 63,289 (Jan. 1, 1921, estimate) and routes averaging more than 2 miles from the business and amusement center, Kenosha has only 43,710 people with routes as follows:

| | Miles |
|---|---|
| Milwaukee Avenue | 1.21 |
| Elizabeth Street | 1.69 |
| Market Street | 1.64 |
| Sheridan Road | 1.30 |
| Grand Avenue | 1.30 |

All of these routes converge at the center of the city. The fares are 7 cents cash, or eight metal tokens for 50 cents; children's fares 4 cents, and the weekly pass for $1. The passes sold during the first week ended Jan. 30, 1921, were 392; for the week of Feb. 6, 445; Feb. 13, 501; Feb. 19, 465, and Feb. 26, 498. For the week of Feb. 13 the passes brought approximately 15 per cent of the revenue. At present about one-fifth of the revenue riders travel on passes. More recent figures are:

| Week Ended: | | Week Ended: | |
|---|---|---|---|
| April 10 | 466 | May 29 | 446 |
| April 17 | 474 | June 5 | 403 |
| April 24 | 483 | June 12 | 400 |
| May 1 | 471 | June 19 | 402 |
| May 8 | 477 | June 26 | 412 |
| May 15 | 456 | April 3 | 514 |
| May 22 | 433 | | |

These figures reflect the tendency toward a decline with the advent of automobile weather. The Kenosha lines have had harder luck than Racine as regards bridges, for in their case the main route has been cut in half during the construction of a new high-level bridge on Main Street since June 10, 1920. Therefore, the possibilities of the pass remain to be determined, although the management has got out inserts with light bills and distributed car dodgers to advertise the pass more extensively than has been done at Racine.

Indeed, as regards both communities, there is still room to sell the pass to a larger number of people on the basis of convenience rather than economy. Such additional patrons are very desirable because they will naturally raise the average rate of fare from this class of business.

## An Illuminated Time Table

A METHOD of lighting time tables as employed at the Waterloo station of the London & Northwestern Railway was described recently in the *Railway Engineer*. The time tables are mounted on racks in the center of the concourse, being pasted on inclined panels of clear glass illuminated by transmitted light from lamps inside the rack. Three 20-watt lamps, distributed behind the panel and, of course, serving to illuminate the panels on the reverse side, are used. By this means uniform illumination, equivalent to 4 foot-candles, is provided, and in these circumstances the smallest figures can be read with ease. As the light comes entirely from behind the time tables there is no danger of inconvenient shadows being cast by the observer as he reads.

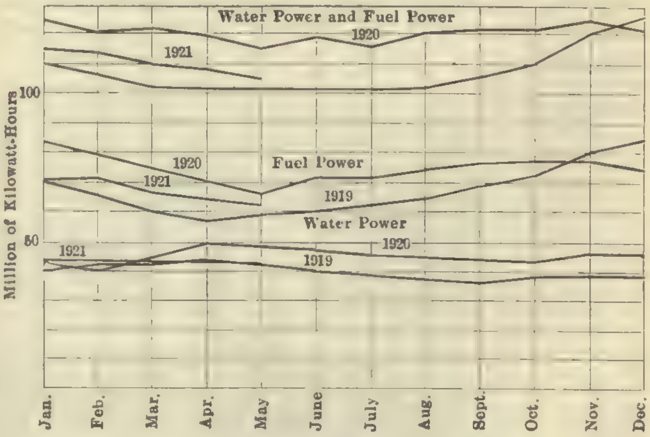
On the Underground Railways illuminated information signs also play an important role, saving the staff a great deal of questioning by the public and materially assisting them in directing traffic. Experiments are also being conducted with a form of sign which might be placed transversely across the platform, so that it could be seen by any one looking out of the window of an approaching train.

## Statistics on Power Generation

ON JULY 28 the United States Geological Survey issued a bulletin giving statistics of the production of electric power by public utility power plants in the United States during the first part of 1921, and for several previous years. A chart which shows the average daily production for this period is published herewith.

The quantities in this chart are based on returns received from about 3,200 power plants of 100-kw. capacity, or more, engaged in public service, including central stations, electric railways, and certain other plants which contribute to the public supply. The capacity of plants submitting reports of their operations is about 95 per cent of the capacity of all plants listed. The output of plants which do not report is estimated.

The mean daily output in kilowatt-hours for January, February, March, April and May was 114,200,000, 113,400,000, 109,600,000 108,000,000 and 105,400,000 respectively. The proportion produced by water power was as follows: 37.9, 37.7, 39.6, 40.4 and 40.6 per cent, respectively. The mean daily rate of production of electricity by public utility plants for May, 1921, is the lowest since August, 1919. It should be noted, however, that the decrease in the daily output of electricity by public utility plants since January as shown by the curve of total output for 1921 is probably the normal seasonal decrease due to the increasing hours of daylight.



AVERAGE DAILY PRODUCTION OF KW.-HR. BY PUBLIC UTILITY PLANTS IN THE UNITED STATES

# Equipment and Its Maintenance

*Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments*

## Steam-Heating Electric Trains in Switzerland

**Single-Phase Current at 15,000 Volts Is Applied Directly to the Water in a Specially Designed Boiler, Thus Generating Steam Which Is Used for Heating**

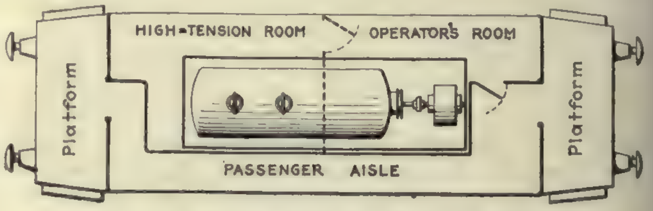
By William A. Rosenberger, M. E.
Zurich, Switzerland

With electrification of the Swiss Federal Railroads in full swing, the problem of heating the trains became an important and somewhat disagreeable side issue. Although early during the recent war Swiss industry had been forced to seek ways and means to replace that part of their coal and fuel imports which their neighbors could no longer let them have, it was not until some time after the conclusion of the great conflict that Brown Boveri & Company, in Baden, Switzerland, together with Sulzer Brothers in Winterthur, succeeded in applying directly and for the first time, a single-phase 15,000-volt, 16⅔ periods current for the purpose of steam creation by electricity. When I say "directly" I mean without transformation. It is, therefore, now possible to send a 15,000-volt current directly into the water of a suitably constructed boiler, in which all the electric energy is transformed into heat and used to generate steam. But, if this is possible with a 15,000-volt single-phase current, it is also possible with a 26,000-volt three-phase alternating current, which certainly represents a considerable advance in a short space of time, for only two years ago the outlook of ever being able to use a tension exceeding 8,000 volts was far from promising. Today, however, the problem seems to be solved so that in Switzerland electric trains will be heated by "electric steam."

The first outfit of this kind made its maiden trip, a few weeks ago, between Bern and Thun. The electrical steam generating plant of this heating wagon, in the manufacture of which the two previously mentioned Swiss firms had each their part, is installed in a four-axle freight car altered for this purpose by the Swiss Federal Railroads. About the only outward distinguishing sign is the pantograph current collector, a trapdoor-like arrangement on top of the roof, and a few insulators.

The accompanying illustration shows the first experimental heating wagon of this type coupled in between two passenger cars.

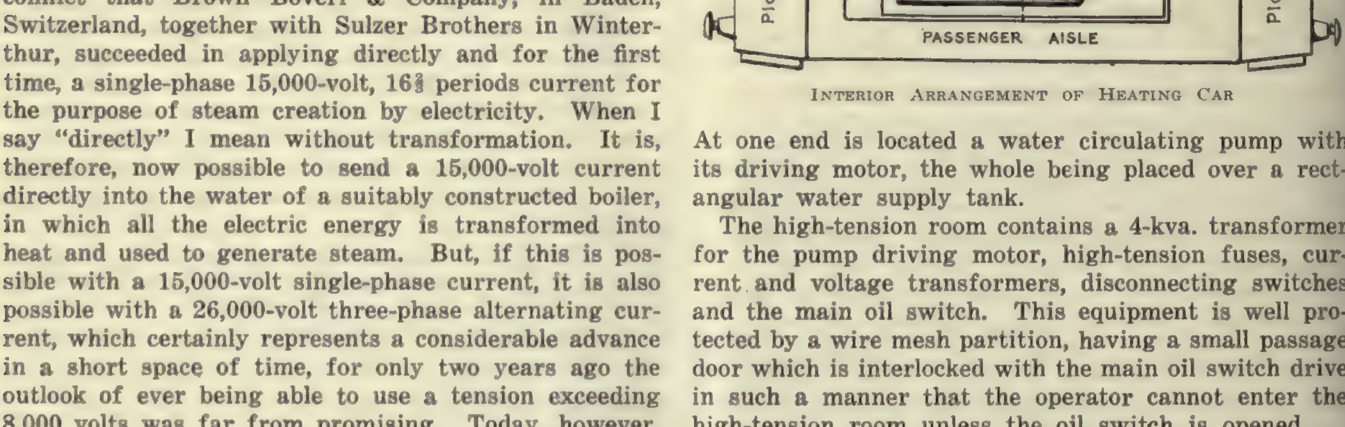
The heating wagon has two rooms and an aisle running straight through which serves as a passageway for travelers. The boiler proper is of the horizontal type, approximately 10 ft. long by 4 ft. in diameter. At one end is located a water circulating pump with its driving motor, the whole being placed over a rectangular water supply tank.



Interior Arrangement of Heating Car

The high-tension room contains a 4-kva. transformer for the pump driving motor, high-tension fuses, current and voltage transformers, disconnecting switches and the main oil switch. This equipment is well protected by a wire mesh partition, having a small passage door which is interlocked with the main oil switch drive in such a manner that the operator cannot enter the high-tension room unless the oil switch is opened.

The boiler, which is heavily insulated against heat losses, has two steam-tight current-inlet insulators, of which each connects with a system of electrodes of special design, developed by the engineers of Brown Boveri & Company. These electrodes are easily adjustable from the operator's room while under tension, thus permitting of varying the load between 300 and



Experimental Electric Steam Heating Car in the Middle of a Train

1,200 kw. according to requirements. As a rule one of the electrodes is quite sufficient for heating under average operating conditions, so that the second electrode constitutes a reserve to be used only while starting to heat up a train or during most severe cold. According to Swiss practice, we calculate for heating purposes with an expenditure of energy of from 5.7 to 8.5 watts per cubic foot, or figuring with an average passenger coach of 4,000 cu.ft. each coach would require from 23 to 34 kw., including all losses. A single electrode could therefore supply sufficient steam to heat a ten-car passenger train under average conditions. This heating wagon is placed as near as possible to the center of the train in order to reduce steam transmission losses to a minimum.

While it is by no means impossible or even impracticable to provide for an entirely automatic operation of this equipment, it was thought preferable with this first experimental outfit to avoid all unnecessary complication by providing for an attendant. Nevertheless there are a number of interesting automatic safety provisions, such as the automatic lowering of the current collector when the door between the operating room and the high-tension room is opened, which, at any rate, is only possible after the main oil switch has been opened. For emergency cases a safety pull is provided by means of which the oil switch is opened and the current collector lowered, while at the same time trapdoors, provided in the roof, are raised to offer escaping steam an unrestricted outlet to the open air and facilitate ventilation.

The oil switch also opens automatically in case of any short-circuit within the boiler or any part of the line between oil switch and boiler, as it does also as soon as the speed of the pump driving motor drops off below a certain minimum, or when the air pressure holding the current collector in position reaches a certain minimum value.

In addition to the 15,000-volt heating wagon, two others operated at 1,000 volts have been tried out by the Swiss Federal Railroads. One of these, also a Brown-Boveri-Sulzer product, is now doing satisfactory service on the Gotthard line, between Erstfeld and Bellinzona. This low-tension heating wagon is coupled directly with the electric locomotive and derives its current from the transformer of the latter. Its operation is, contrary to the 15,000-volt heating wagon, entirely automatic.

## Removable Unit Type Circuit Breaker

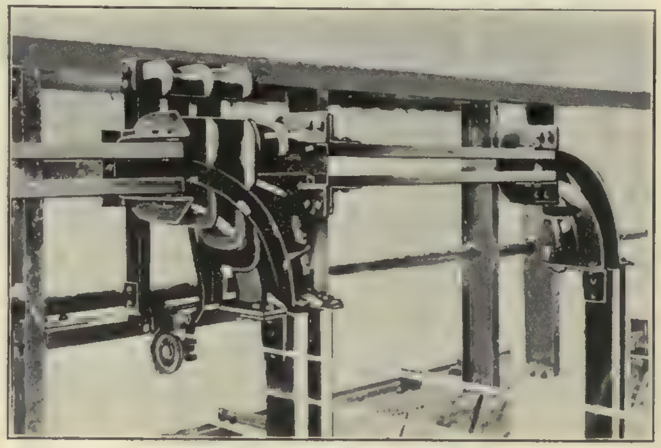
TO MEET the demand of central stations for a high interrupting capacity breaker of the removable unit type, to replace breakers inadequate to handle the existing interrupting capacity of a section, the Condit Electrical Manufacturing Company has placed on the market the type F-10 oil circuit breaker. This circuit breaker is compact and will go into most any cell formerly occupied by an oil circuit breaker having an interrupting capacity between 1,200 and 2,000 amp. per phase at 15,000 volts. As the interrupting capacity of the circiut breaker is 10,000 amp. per phase at 15,000 volts, this allows central stations to increase the interrupting capacity of their equipment from five to eight times.

As these breakers are not supported from any cell structure it is only necessary to install the tracks on the cell floor. No overhead framework is necessary and in general no change is required in the masonry, busbars or connections to the breaker.

Type F-10 oil circuit breakers are built in capacities from 500 to 1,200 amp. at 15,000 volts and 500 to 800 amp. at 25,000 volts, single throw, and can be furnished for single or multiple operation.

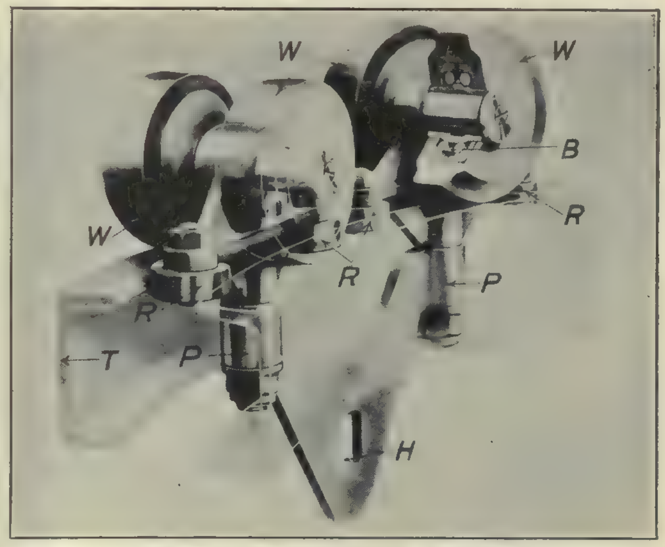
## New Trolley Transveyor System

THE Whiting Corporation of Harvey, Ill., has placed on the market what it terms the short-turn overhead trolley system. This is a comparatively new departure, but several successful installations are now in use. The track consists of two parallel standard rolled channels 2⅛ in. between flanges and held in place by clamps. It is designed to carry loads with no intermediate supports except at the splices, corners and switch points. The corners and switch connections are interchangeable, so that when found desirable a right corner can be removed and a double switch or universal switch can be bolted in the same place. All of the short-turn corners and switches have a track curvature of 18 in.

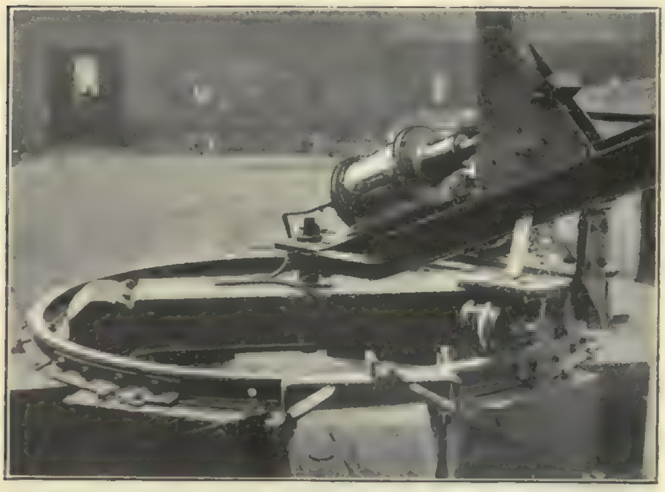


STANDARD SWITCH AND CORNER

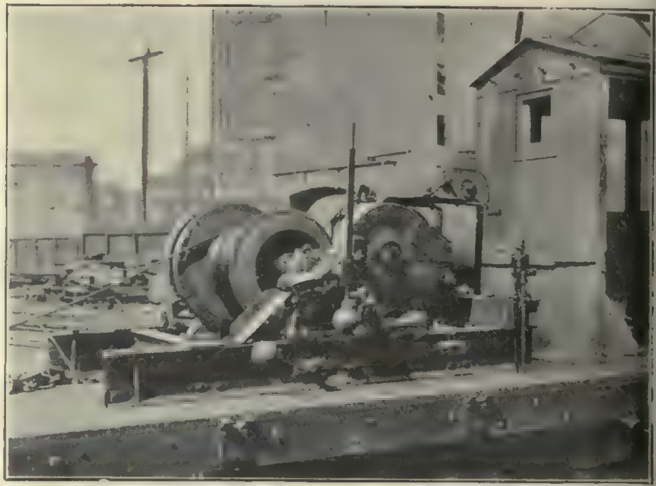
The track equipment is arranged for two-wheel, four-wheel or eight-wheel trolleys. These trolleys have ball-bearing wheels and guide rollers which run between the toes of the channels.



VIEW OF SHORT-TURN TROLLEY
*W*, wheels. *B*, ball bearings. *R*, guide rollers. *T*, supporting channels. *P*, pivots. *H*, hoist connection.



Turntable and Air Cylinder for Derrick of Plow Car



Winch Mounting and Accessories

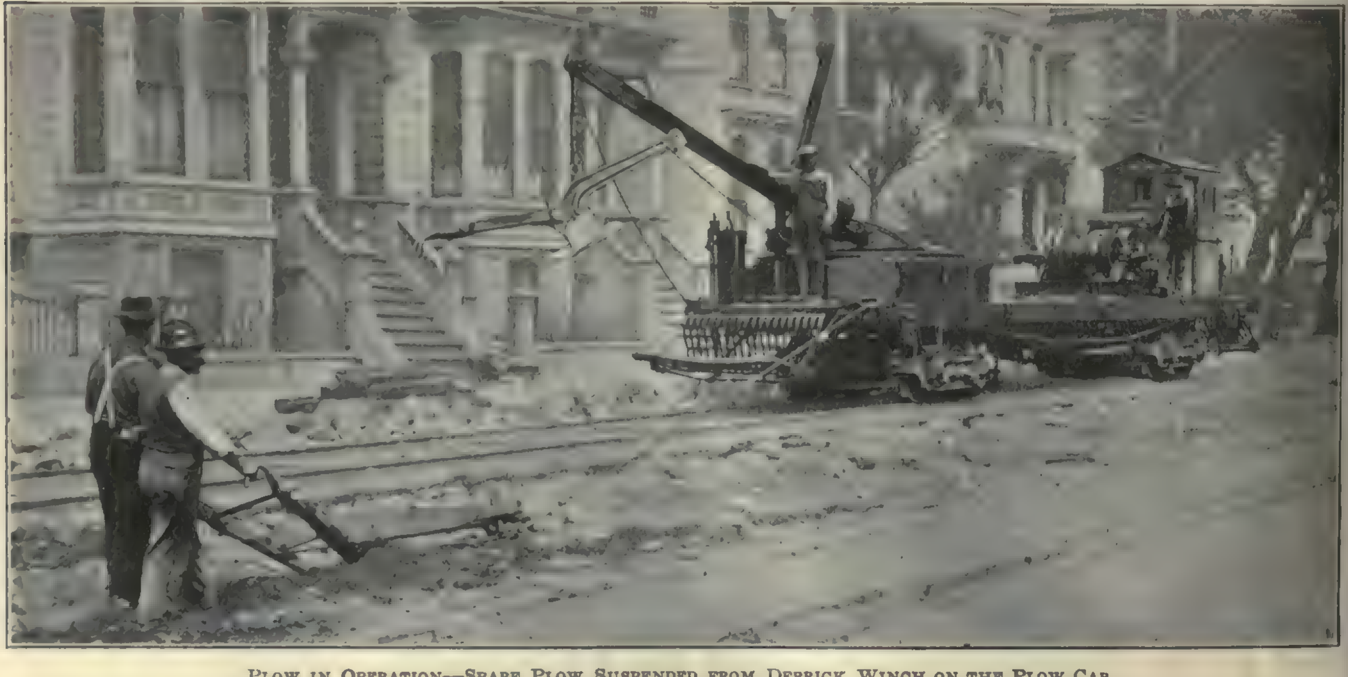
## Car Equipped to Operate Power Plow

A CAR recently fitted up in the shops of the Market Street Railway of San Francisco to provide a convenient and economical means of plowing up the right-of-way, consists of an ordinary work car from which one of the cabs was removed and on which were mounted a winch with its accessories and a derrick. The arrangement has been successful in doing all necessary plowing and rooting out ties and concrete along the right-of-way. Furrows 11 ft. outside the rails have been made, and where anchorage for a snatch block is available this distance of offset could be greatly increased. This method of plowing with power has been used for eight years but the power has always been furnished by a 6-ton derrick car. A few months ago plowing had to be done while the derrick car was on work from which it could not be spared. The car here described was constructed to serve in the emergency.

The plow is drawn by a cable running from a 3-ton single-drum winch driven by a GE-1,000 motor with an ordinary type K controller. The cable passes between guide sheaves at the center of the rear end of the car. Additional sheaves are also provided on either corner so that the line can readily be offset this far when desired. To offset the hauling line still further, an anchor chain and snatch block are attached to the end of a tie rod in the adjacent track (if the work is between two tracks). By adjusting the length of the chain the offset can be regulated as desired. The side of the snatch block is hinged so that the cable need not be threaded through it but can be dropped into place by opening up the side. The car is used on a temporary portable T-rail track at the side of the track trench being plowed.

For lifting the plow off the ground the car is provided with a power derrick operated by a 10-in. air-brake cylinder which takes air from the air reservoir of the car itself. The 1-ft. throw of the piston in this brake cylinder is multiplied by the mechanical arrangement shown in the accompanying illustration in a ratio of 1 to 8, so that for the 1-ft. movement of the piston the derrick hook is moved a distance of 8 ft., which is sufficient for handling the plow.

The mechanical arrangement of lever and rope is such that the ratio can be easily and quickly changed



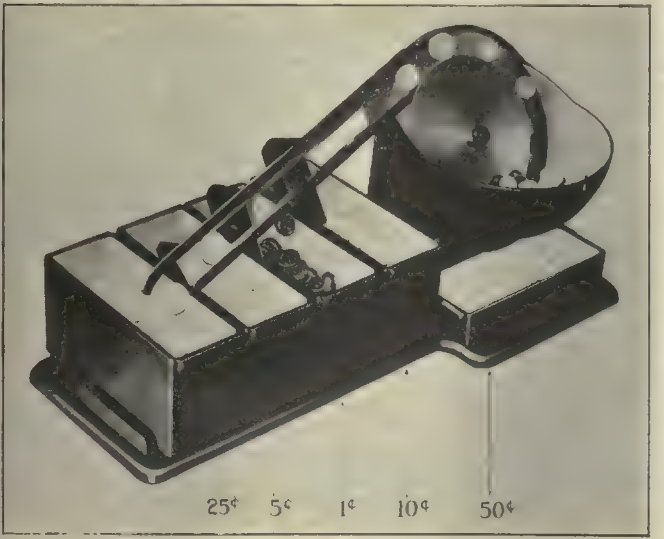
Plow in Operation—Spare Plow Suspended from Derrick Winch on the Plow Car to any of the following: 1 to 8, 1 to 6, 1 to 4 or 1 to 2. The 1 to 8 ratio is sufficient to raise a weight of 500 lb., this capacity increasing of course as the ratio is decreased. The plow weighs about 450 lb. The derrick boom is swung by hand into any desired position on a circular track built up on the car platform. This track has a stop to prevent a continuously circular motion, thus insuring that the flexible air supply line will serve the cylinder in all positions of the boom. The air cylinder is operated by an ordinary brake valve near the winch.

No return line is used on the plow with this rig. When a new furrow is to be started the derrick raises the plow and the car moves down the track with it to the point where the furrow is to start. After setting the plow in place the car moves back, paying out the cable as it goes, until the far end of the furrow has been reached. The plow is then drawn up to the car and the operation repeated.

The details of this device were worked out by W. D. Chamberlin, principal assistant engineer. B. P. Legare is engineer of maintenance of way, Market Street Railway Co.

## An Inexpensive Coin Counter

AN EXTREMELY simple and inexpensive coin-counting machine which may be purchased outright rather than used on the rental basis usually required has been made available by the Coinometer Company, Detroit, Mich. This consists of a motor-driven disk which picks up individual coins of all denominations from the container in which it revolves, lifts the coins up to the top of the disk, whence they roll by gravity down an incline extending over compartments for receiving the coins. This incline has a graduated opening which permits the coins to drop through into the proper compartment as they reach the opening of proper size. The disk and incline are mounted in an inclined position so that, while carried edgewise, the coins lean back against the support and therefore drop through the opening at the first opportunity.

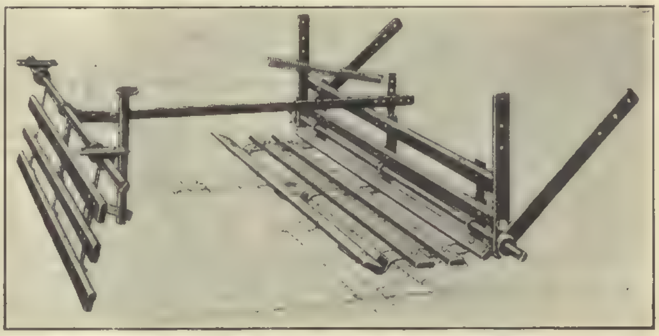


SIMPLE AND INEXPENSIVE COIN-COUNTING MACHINE

It is claimed that the machine will count accurately 1,200 coins per minute or 72,000 coins per hour. It is said to sort a mere handful or a bushel of mixed coins with guaranteed accuracy at the rate noted above and every coin is always in plain sight with no danger of lost money. It weighs less than 23 lb., is 21 in. long by 10 in. wide and 10 in. high. It is constructed of solid metal throughout and finished in black enamel.

## A New Life Guard

A NEW spring life guard has been placed on the market by the Root Spring Scraper Company, Kalamazoo, Mich., which is claimed to have very light weight. Spring steel is used for every part subject to possible breakage, thus giving a flexibility which tends to overcome breakage and also decreases the probability of injury to a person picked up. The drop fender is made entirely of spring steel with the members bent in such a manner that they will ride over the rail and pavement without catching and yet pick up any object encountered.



NEW LIFE GUARD THAT IT IS CLAIMED WILL NOT RATTLE DOWN

The operating device connecting the gate to the drop fender is made in such a manner that the trip break is below or slightly past center when the guard is in normal position. There is thus claimed to be no possibility of the guard being tripped, due to vibration or shock. It is claimed, however, that the guard drops very quickly, the speed of this action being increased by a heavy coil spring, when anything strikes the gate.

## Plan to Reduce the Time and Cost of Air Seasoning Wood

IN CO-OPERATION with the sawmills and wood utilization plants throughout the country, the Forest Products Laboratory, Madison, Wis., is organizing an extensive field study on the air seasoning of wood. This study, it is believed, will be of extreme interest to the lumber manufacturer and to the wood-using industries. The purpose is to determine the piling practice which will result in the fastest drying rates consistent with the least depreciation of stock, the least amount of required yard space, and the least handling costs.

The air seasoning of wood is an old practice. No systematic attempt has ever been made, however, to work out the exact conditions under which drying time and drying costs can be reduced to a minimum. The new project will furnish a comparison of the effects of such piling variables as sticker heights, the spacing of boards in layers, the heights of pile foundations, and the directions of piling with relation to prevailing winds and yard alleyways.

A tentative working plan of the air seasoning study has been prepared by the Forest Products Laboratory, and copies are being sent to the secretaries of the various lumber and wood-using associations, state foresters, forest school heads, and others eminently qualified to comment on the plan.

# Winning Public Support and Confidence*

### Some Facts Which Few of the Public Know—The Industry's Responsibility to Assume Leadership and Let the Public Know

By George L. Myers
Assistant to the President Pacific Power & Light Company, Portland, Ore.

THE public service industry is in greater need of the support and confidence of the people than any other industry because of the powers exercised by government in its control. It is dependent for its success upon the nature of regulation, which reflects the political policy of the state. The policy in turn is determined by the public sentiment, which is nothing but the expression of the people's understanding and knowledge. The essentials fundamental to wholesome and constructive public sentiments are service and knowledge. Service must be courteous, efficient and adequate. The personnel of an organization and the physical stability of its property determine the nature of its service.

#### ANTIPATHY MUST BE OVERCOME

Irrespective of the fact that the public service industry is controlled as is no other industry, in none other is there more antipathy on the part of the public. The fundamental reasons which come to mind as responsible for this antipathy are the magnitude and volume of the business, the conditions of natural monopoly within the territories served, the exclusive nature of the service, the quasi-governmental function of it, the convenience in its use and the impersonal relationships. The volume of the business in dollars and cents too often appeals to the public's imagination as the measure of profit rather than the return in percentage upon the investment when there is no understanding of what actually constitutes profit. The condition of natural monopoly and the exclusive nature of the service strengthen the conviction that there must be enormous profits. Also the sovereign powers vested in a public service company and the essential and universal nature of the service give to the public service the attribute of a government service. Many pay nothing directly for what they get out of government. People seem to have an inherent sense of propriety without responsibility in a public service company in return for the privileges given it to do business, which leads them to regard a public service company as a vendor of benevolent service.

Public utility service today in general is not supplied by local plants with their operations localized, but by what might be properly termed for purposes of differentiation a system or systems. Capital for development is drawn from all sources of the country, and furthermore control is often vested far from the existing field of operation. These conditions have broken down the close personal or local relations which formerly existed and require new policies that will break down the barriers which have developed.

Too few people know the essential facts and principles of public service finance. There is still much agitation about watered stocks, although the element of capitalization today is not the basis for rates and return. Many have the impression capital in public service companies is closely held and that only a few participate in the earnings available to pay interest and dividends. The fact is that about 1,400,000 men and women in the electric light and power industry alone are owners of stocks and bonds and more than $300,000,000 of the assets of insurance companies is invested in its securities. In excess of $1,700,000,000 in bank funds are invested in public utility securities. Therefore, while there has been a tendency toward centralization in management and control in the interests of greater efficiency and economy, there has been a growing decentralization in ownership.

Another factor is that there is no general knowledge of the extent to which a public service company is held accountable to authorities of government for its conduct nor of the restrictions placed upon it. The measure of government control to safeguard and protect the public interests should become common knowledge. The orders and decisions of commissions and the opinions of courts must be made clear to the public mind, and their influence and effect brought to public recognition, not alone in cases of local interest and concern, but in those of state and national determination as well.

#### RESPONSIBILITY IS ON INDUSTRY

If we will concede the public must have a better knowledge and understanding of the facts concerning the industry before it can prosper as it deserves, then the important consideration is the policies and methods whereby this result may be accomplished. The responsibility is upon the industry, and it must assume the leadership. Various means may be taken to get the proper contact with the public whereby the proper public sentiment can be developed, but probably the most effective means is through the press. The press must be impressed with the purpose and spirit of the movement. Its confidence must be inspired and interest aroused. There is another important field for education within the industry. There is not a sufficient understanding of the facts among those who are employed in it. Each department head and employee is not without his coterie of friends and points of personal contact. The personnel should be made to understand that the prosperity of the company and the industry depends upon public sentiment and that they have their part in making it favorable or unfavorable, which in turn is reflected in their prosperity.

The company publication, or what might be termed in common parlance "the house organ," can be made a most effective means for education, as it can be used to cement the organization into a more interested whole.

The industry should not only be alert to the problem of getting the public informed, but it should act in a manner to command public respect. It is often the policy not to dignify unjust criticisms and untruthful attacks with refutation, as this gives rise to controversy, and most utilities seek to avoid controversy, but why let the lie stand to shame the truth when facts are available?

A good deal of what has been said may be considered by some to be idealistic, but it is an idealism which can be made of practical effect if there is only the will to do it. The industry is in need of some idealism and a spirit which values the worthiness of its service and a faith in the common sense and fairness of the people.

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*Short abstract of address at the Fourteenth Annual Convention of the Northwest Electric Light and Power Association, Multnomah Hotel, Portland, Ore., June 16, 1921.

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# New England Club Has Outing

### Delegates Frolic at Aldrich Lake and Enjoy Trips to Mount Tom, Where Banquet Closed the Day's Festivities

THE annual outing of the New England Street Railway Club, of which Edward Dana of Boston is president, was held on July 28. The Holyoke Street Railway and its officials were the hosts for the day. Probably no other single outing of the club was ever more successful, not only from an entertainment point of view but in reflecting what can be accomplished by the pull-together spirit that exists between the railway company, its employees and other local civic organizations that have the welfare and growth of the community at heart.

The day started with an inspection of the shops and carhouses of the railway company in Holyoke, after which three special cars took the delegates and invited guests to Aldrich Lake where sports were enjoyed. The baseball game between the railway and supply men ended in a tie after six innings, hence the silver mounted bat which was won last year by the supply men still remains in their possession. John Wilkinson, Boston Elevated Railway, captained the railway team, and Joseph G. Dellert of Boston was the captain for the supply men. Other sports and swimming races were also enjoyed.

Luncheon was served at the lake, after which the party again boarded the cars for an inspection trip, via Amherst, Old Hadley and Northampton en route to Mountain Park. Opportunity was thus given to see a large part of the trolley system, the country served, the numerous colleges that abound in this territory, and other historical points of interest, of which there are many. Arriving at Mountain Park shortly before 4 o'clock, the party was entertained at a special matinee of six acts by the artists playing at the theater. After the show came the trip up Mount Tom over the incline railway. Prior to dinner on the summit the delegates had an opportunity to view the wonderful scenery of central Massachusetts from the vantage point of the Summit House. Promptly at 7 o'clock 210 delegates sat down to a real Mount Tom roast chicken dinner. Souveniers of Holyoke's industrial life were furnished by the Chamber of Commerce to each visitor, consisting of writing paper, loose-leaf booklets or pads, and spools of thread.

Following the dinner a short business session was held at which twenty-five new members were voted into the club, making a total of ninety-one since President Dana started his campaign for increased membership. Mayor John F. Cronin of Holyoke, who had been with the party all day, extended an official welcome on behalf of the city. A vote of thanks was extended to L. D. Pellissier, president of the Holyoke Street Railway in appreciation of his interesting efforts and the success that has attended them. Replying, he expressed his keen appreciation that the club had selected Holyoke for the outing. He then presented on behalf of the club a Seth Thomas chime mantel clock to Fred F. Stockwell, the club's treasurer, for his unselfish services, and a purse of gold to John W. Belling, the secretary. Acceptable remarks were made by both recipients. After the banquet moving pictures provided entertainment including a film that the Holyoke Street Railway has just had prepared for advertising Mount Tom's beauties throughout the country.

The committee in charge consisted of W. W. Field, Boston, chairman, with L. D. Pellissier, the Holyoke chairman, and George E. Pellissier as vice-chairman.

# Regulation of Public Utilities

**Regulatory Laws Must Conform to Economic Laws—Division of Regulation Between Judiciary and Legislative Authorities — Utility Boards Should Be Composed of Men of Broad Vision**

By HARVEY S. CARR*

Carr & Carroll, Attorneys, Camden, N. J.

FROM the creeping, creaking stagecoach and the isolated inn of Plantagenet, England, to the vestibuled train the de luxe, the fast freight line, the whaleback steamer and the towering grain elevator of the America of today is a far cry. Yet it is to these humble and remote sources—the state regulated innkeeper, hack driver, baker, farrier and tailor of mediæval times—that the United States Supreme Court turns in search of the basic principles governing the right of the state to regulate the great modern public utilities that touch the daily life of millions of our people.

In God's providence the empire builders were not discouraged by regulation—the Harrimans, the Hills, the Morgans, the Goulds and the Vanderbilts—these men of vision and constructive imagination were not preceded by heralds bearing aloft "blue sky" banners, with that soul-inspiring legend "Safety First." Neither were they accompanied through the forests and over the majestic rivers and mountains by the regulatory bodies of forty-eight separate states. Some of them may have been rude and crude, whiskered and wicked, but they did great things and posterity is their debtor.

With the concentration of power came abuses, actual or potential, rebates, discrimination and oppressions, and the public sought to protect itself by regulatory statutes, boards and agencies. As a result of a long legal history, it may now be accepted as settled that the power to prescribe rates is legislative. The power to determine whether rates prescribed would, if enforced, impair or destroy rights of property that are protected by constitutional law is judicial.

### THE VALUE OF THE SERVICE TO THE CONSUMER

It is unfortunate that the method of review by the United States Supreme Court appears to preclude an examination and disposal of the whole subject matter of the inquiry. The cases reach that court usually upon the initiative of the public utility company and under the Fifth or Fourteenth Amendment upon the claim that the instant rate results in the taking of property without due process of law and is therefore confiscatory.

This necessarily limits the determination of a finding that a particular rate is or is not confiscatory. Hence, the basis of the adjudication must always be the aggregate return on the capital invested and not the value of the service to the individual user.

So the supposed danger to the consumer resulting from excessive charges growing out of monopolistic control is lost sight of and never becomes a subject of adjudication. The utility is on the defensive and seeks to protect the confiscation of its property by the public. The Supreme Court can do no more than to enforce a vote upon confiscatory legislation, hence the primary question for which regulation was designed, viz., is the particular rate or charge of the utility unjust or oppressive? remains unadjudicated.

It seems a curious anomaly of our judicial system that the very question that state regulation was intended to cover cannot be adjudicated by the court of last resort.

### ECONOMIC LAW AND STATE REGULATION MUST COINCIDE

To the extent that a rate or regulation is in conflict with economic law it is erroneous. Public utility boards must adopt the broad economic view and must enforce a policy based thereon whether it is immediately popular or not. Rate questions become in time the issues of a political campaign with all of the accompanying rancor. It is difficult for a utility board not to be influenced by such clamor, especially since in New Jersey it combines with legislative power the powers of prosecutor, judge and jury, and institutes proceedings on its own initiative.

The disputes that come before a utility board for determination are usually far more serious and important than suits which come before courts of law or equity. A determination of a utility board in a populous state may touch the daily life of millions of persons and affect property values running into hundreds of millions of dollars. An erroneous decision in an important matter always affects the public injuriously. If the rate allowed is too high, the injury is direct. If too low, the injury, although consequential, may be far more serious in the resultant impairment of service and impairment of the confidence of the investing public, from whom alone the needed capital for extensions and improvements can come. Hence, it is of the utmost importance that a public utility board, wielding such immense power for weal or for woe, and whose findings as a practical matter are subject to but scant supervision by appellate courts, be composed of men of courage, vision and of broad and accurate economic views. Many of the men who have served on these commissions and many of those still serving are of this character. Especially is this true of our present commission in New Jersey.

Ultimately informed public opinion will control the situation. If this were not so democracy would not exist. Where the utility has taken the public into its confidence and cultivates friendly relations with its customers, conditions are much improved, and reasonable requests for modification of rates have not been seriously opposed by the public.

### CONCLUSIONS

1. Rates must be just and reasonable.

2. Fairness of the individual rates should be reached by allowing the utility to earn in the aggregate a sufficient sum to pay its operating cost and the accumulation of a reasonable surplus to provide for the unforseen contingencies of the future. This should be the basis of rate making.

3. Rates must be sufficient to attract capital.

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*Abstract of paper read before the Pennsylvania State Bar Association at Asbury Park, June 29, 1921.

4. Rates must not be so low as to be confiscatory.

5. Efficient and economical operation should be required, encouraged and rewarded, and should be reflected in profits and dividends.

6. The rate-making machinery should be in the hands of a special tribunal composed of men trained in that class of work. The rate must be such as will afford protection of the individual consumer from oppressive rates, and yet such that the utility will be permitted to live and give adequate, efficient and satisfactory service.

7. The legal machinery of review is inadequate in that it does not usually permit a review of the merits of the entire controversy.

[The complete paper gives a very able presentation of the historical development of Supreme Court regulatory decisions, with clear interpretations of each decision supported by legal opinion.—EDITORS.]

### Pennsylvania Electric Association

THE Pennsylvania Electric Association will hold its fourteenth annual convention from Sept. 7 to 10 inclusive at Bedford Springs, Pa. There will be morning and afternoon sessions except on Saturday when the final session will be held in the morning.

The program opens on Wednesday evening, Sept. 7, with the reception to the president. On Thursday morning the chief features will be the address of the president, Henry Harris, of Wilmerding; the appointment of auditing and nominating committees and a paper on "The Super-Power Survey as It May Affect Pennsylvania," by Harold Goodwin, Jr. The afternoon session will be a commercial meeting with a number of reports and papers. The technical session will be held on Friday morning, Sept. 9, while the accounting session will be held on the morning of Saturday, Sept. 10. Prominent speakers will address the public policy session on the evening of Friday, Sept. 9.

A feature of the entertainment will be furnished by the Westinghouse Electric & Manufacturing Company of Pittsburgh. Each evening the Westinghouse band will play at Pittsburgh and the concert will be reproduced by means of the radiophone at Bedford Springs.

A. L. Atmore, 1000 Chestnut Street, Philadelphia, is chairman of the program committee, and W. K. Kerford, Philadelphia Electric Company, is chairman of the entertainment committee.

### Industrial Advertising Conference

THE importance of industrial advertising and the necessity of specialized treatment in its development are recognized in a plan to hold an Industrial Advertising Conference at the Milwaukee Convention (1922) of the Associated Advertising Clubs of the World. The movement is being promoted by the Engineering Advertisers' Association of Chicago and the Technical Publicity Association of New York.

# American Association News

## How Taxation Affects Public Utilities*

**Public Utilities Are a Separate Class in Regulation but Are Not So Treated in Taxation—The Supply of New Capital Is Limited by the Effects of the Present Taxation System**

By P. H. GADSDEN

President American Electric Railway Association; Chairman of Joint Tax Committee of A. E. R. A., N. E. L. A. and A. G. A.

WE URGE that public utilities be placed in a special class for the purpose of taxation, so that the burden of Federal taxation to be imposed upon them may be determined in the light of the fact that they are regulated industries. Public utilities are already by law treated as a special class for everything except taxation. Their rates and the selling price of their products are fixed by law. They are compelled to buy their labor and material in the open market and to sell at prices fixed under regulation. The public utilities are segregated in a separate class with reference to their operating expenses. The kind and quality of the service rendered by them is largely specified by law. The ordinary business man can adjust his affairs to the varying conditions of the time. In periods of depression he can retrench, reduce his activities, and cut off his expenses. The individual can do the same. The utilities cannot. They can neither adjust their revenues to meet increasing operating expenses or increased taxation, nor curtail their facilities for business operations.

Again, they are placed in a special class so far as undertaking new business is concerned. The merchant or manufacturer can refuse to take on business when he sees no profit in it. Public utilities must furnish electric transportation, gas, electric light, and power to all who apply for it under regulations fixed by law.

But when it comes to taxation, public utilities have up to this time been treated as any other business corporation, notwithstanding the fact that a public utility's return on its investment is limited by law, whereas the ordinary business corporation is free to make any profit which business conditions will permit.

For these reasons we urge the Ways and Means Committee to consider adopting a permanent policy of setting aside all public utilities—that is, regulated industry, in a special chapter to be treated separately for the purposes of Federal taxation.

2. The American Electric Railway Association, American Gas Association, and the National Electric Light Association, earnestly protest against any increase in the normal income tax on gas, electric railway, and electric light and power companies, and urge that the normal income tax on public utilities be kept as at present at 10 per cent and not increased along with business corporations generally as has been proposed. The reason for this distinction is apparent to anyone who is conversant with the history of public utilities during the last four or five years. It is admitted that of all classes of business enterprise, the public utilities have suffered the greatest injury as a result of the war. For several years when every other class of business was prospering beyond anything ever anticipated, the net income of the public utilities gradually, month by month, diminished; in many cases dividends on stocks were passed, and even interest on bonds left unpaid at a time when industry generally was enjoying an unparalleled prosperity.

We urge, therefore, that it is only fair that the burden of Federal taxation on public utilities should be made lighter than on business generally. Their rates for service, being regulated by law, are not easily adjusted to increased expenses. Owing to the local character of electric railways, gas, and electric light and power companies, it was not found practicable during the war for Congress to take any action to relieve their condition such as was taken in the case of the steam railroads. They have had to bear the full brunt of increases in the cost of labor and materials without any assistance from the Federal Government, notwithstanding the fact that it is now clearly recognized that the services they render are essential to the national life. Here is an opportunity, however, for Congress to show its appreciation of the plight of the public utilities of this country and afford them some measure of relief. It was in recognition of these facts that the committee of the National Industrial Conference Board in its report recommended that the income tax on public utilities be retained at 10 per cent.

3. *Tax on undistributed income*—A tax on undistributed income would fall with peculiar hardship upon public utilities. In the first place, in a regulated industry there is no opportunity for unusual or excessive earnings. The rate of return is placed at a maximum which rarely exceeds 8 per cent, so that with public utilities it is not possible to declare an 8 per cent dividend

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*A brief presented to the Ways and Means Committee of the House of Representatives as a part of the record of appearance before that committee by W. V. Hill, representing the A. E. R. A., N. E. L. A. and A. G. A.

and retain an equivalent amount in the treasury of the company as undistributed earnings. The reason which is generally urged to support the tax on undistributed income does not apply to regulated industry. There is one reason, however, which, when properly understood, would seem to show that it is clearly against the public interest that such a tax should be applied to public utilities. Owing to the extraordinary increase in the cost of operations, both during and since the war, with the tardy and meager increases in rates which have been allowed, the public utilities as a class have been forced to suspend the payment of dividends and to utilize any small amounts of net income for the purpose of providing for those necessary extensions and betterments of their service which are insistently demanded of them by the public. It is generally recognized that the credit of public utilities has been affected injuriously by the experiences through which they have been forced to go. For years they have been unable to secure the additional new capital necessary to provide the extensions and betterments to plant and facilities to keep apace with the development of their respective communities. In this connection I refer the committee to that portion of the report of the Senate Committee on Reconstruction and Production referring to public utilities. This report shows that public utilities have had to postpone extensions and enlargements of their plant and facilities for years. At the same time, a certain amount of such extensions and betterments have had to be made.

They have been made out of the net income of the public utilities which othewise might have been declared by way of dividends. The tax upon undistributed income of public utilities would still further reduce the available funds now being used for extending the railway, gas and electric light and power services to the consumers of this country. If such a tax is seriously considered by this committee we would urge that either public utilities be expressly exempted, or that the paragraph should be so worded as not to apply to earnings which are reinvested or held for reinvestment in the property within twelve months after the year in which they accrue, or which, together with the earnings distributed, do not exceed, say, 10 per cent return on the value of the property.

4. *Tax-exempt securities.*—While public utilities, unfortunately, are not subject to any excess-profits tax, and while their income taxes amount to a very small amount of money—they amounted in 1918 to only about $12,000,000 for the three industries I represent—while it is true that our stockholders and bondholders have suffered so that their taxes have been very largely reduced, I want to call the committee's attention to the serious burden which the excess-profits taxes and the high surtaxes have in an indirect way upon the public utility business.

We have recently had a study made of the effect of the surtaxes and the income taxes upon the sale of public-utilities securities. We have been very much disturbed to find that under the present fiscal and taxation laws of this Government the taxpayer who is subject to a surtax of over 3 per cent can not afford to buy a public-utility security paying 8 per cent or less in preference to a 5 per cent tax-exempt bond. That means that practically the only purchases of our securities must come from the people who are in the $10,000 class. The reason for it is that the public utility, being regulated by law, its earnings being kept down to practically 8 per cent, cannot, of course, have any long-time issue securities of a greater rate of interest.

#### $1,250,000,000 BEHIND

I am not trying to inject an argument for exemption of securities, but I am showing how vitally interested public utilities are in any law which will spread out the burden of taxation and which will make it possible for Congress to reduce, if not cut out, these very high income taxes. The public utilities of this country, including the steam railroads, must every year find new money for their extensions and betterments. The group I represent requires about $75,000,000 a year. Altogether, including the steam railroads, we need about $2,000,000,000 of new money every year. That money must be obtained in the open market in competition with these municipal securities. No man with a high income can afford to buy our securities, because we cannot afford to pay more than 6, 7 or 8 per cent, as the laws say we cannot get more than that amount. The investor is being driven by that process away from public utilities into municipal bonds, building schoolhouses and courthouses and public roads. The effect of that is this: In the first place, the $2,000,000,000 of betterments which the public requires can not be made. They have not been made in four years. We estimate that public utilities are behind in actual necessities—that is, the three public utilities I represent—at least a billion and a quarter now, owing to the inability to get money.

#### DRIVEN TOWARD MUNICIPALIZATION

The second effect is that as we fail year by year, owing to our inability to get this additional new capital to measure up to the standard and growth of our various communities and fail to render the facilities which the communities must have, there is a growing dissatisfaction in the communities against our service and an increasing demand on the part of the population to take them over. It is quite apparent that the public will say: "If you cannot raise money, we can; we can get all the money we need at 5 per cent." Therefore, we reach this anomalous situation that while the political policies of this Government have been definitely and firmly fixed in opposition to the municipalization of these utilities, the financial and fiscal policies of the Government are inexorably driving us into it. Therefore, any tax whose tendency is to spread out the burden; any tax which will raise money sufficient to enable this Government to relieve the higher brackets on the surtax and the income tax is working in the interest of the public utilities and immediately in the interests of the users of those facilities all over the country.

### Engineering Association Nominations for 1922 Officers

THE committee on nominations for the Engineering Association has reported as its selection for officers for the ensuing year as follows: President, C. S. Kimball, Washington Railway & Electric Company, Washington, D. C.; first vice-president, L. C. Datz, American Cities Company, Birmingham, Ala.; second vice-president, H. A. Johnson, Metropolitan West Side Elevated Railway, Chicago, Ill.; third vice-president, A. B. Stitzer, Ford, Bacon & Davis, New York. These gentlemen, together with Charles H. Clark, Cleveland Railway; Roy C. Cram, Brooklyn (N. Y.) Rapid Transit Company; Daniel Durie, West Penn Traction Company, and Charles Rufus Harte, the Connecticut Company, New Haven, Conn., were nominated as members of the executive committee. J. W. Welsh was nominated for secretary and treasurer.

The report is signed by Martin Schreiber, Public Service Railway, chairman; C. C. Beck, Ohio Brass Company, Mansfield, Ohio; D. E. Crouse, Rochester & Syracuse Railroad, Rochester, N. Y.; John Lindall, Boston (Mass.) Elevated Railway, and F. McVittie, New York State Railways, Rochester.

### Safety Car Committee Meets

THE American Electric Railway Association's committee on safety car operation had a meeting on Aug. 2 at the association headquarters, New York City. Those present were R. P. Stevens, chairman, Republic Engineers, Inc.; James P. Barnes, Louisville Railway; H. B. Flowers, United Railways & Electric Company, Baltimore; W. H. Heulings, Jr., J. G. Brill Company; and C. W. Kellogg, Stone & Webster, Inc.

The scope of the committee as outlined by the executive committee of the association was considered, together with various suggestions from several members, and it was decided to confine the work this year to the consideration of problems closely related to what might be termed as the general aspect of safety car operation as affected by legislation and regulatory action as well as public and labor relations. A brief will be prepared dealing with the present use and benefits derived from safety car operation, and a simple questionnaire will be sent out to collect information regarding the number of the various types of cars operated by one man which are now in use.

# Recent Happenings in Great Britain

### Coal Strike Settlement Opportune—Tramway Showing Better—Glasgow and Manchester Do Well

*(From Our Regular Correspondent)*

After three months—the longest coal strike on record in England—the coal miners' strike came to an end on June 28 and on July 4 work in the pits was resumed as far as it was possible at the time, many mines having been flooded and others seriously thrown out of gear. A ballot had been taken some little time before in which a large majority of the miners voted—the percentage who troubled to vote was quite small—refusing to accept the terms offered, though these were accompanied by a Government offer of £10,000,000 for easing the period of reduction of wages.

AN ATTEMPT was then made to call out other trades unions by way of sympathetic strike, but it failed miserably. Following this the executive of the miners' union eagerly sought conference with the mine owners for a settlement. The settlement was confined to a question of wages and the national pool of profits demand was dropped like a hot coal.

The new conference was held in the end of June and an agreement reached which professes to be permanent. The miners are to get the £10,000,000 so far as it is required to ease specific hard conditions during three months' progressive reduction of wages. Thereafter the industry is to be on an economic basis, with wage boards to settle all disputes.

The most important point is that the profit-sharing principle is to be more fully adopted than it has ever been before, the workmen obtaining fixed proportions of all surplus profits. In this way it is hoped the production will be increased—the great desideratum—and that thereby coal prices will come down.

Matters have been so arranged that the incentive to increased production is powerful. In the early days of July preparations were active in many branches of industry for resuming work at full pressure. It is reported that there is an accumulation of orders in the hands of manufacturers, and as soon as coal is plentiful, and it is hoped cheaper, the way will be open for development.

A sign of the times in this connection is that the employees in numerous important industries, including the engineering trades, are agreeing with the employers to accept material reductions in wages, the impelling force being the gradual fall in the cost of living. Wages were raised because of the increase of the cost of living; now they are to fall correspondingly.

The tide of swelling wages in the British tramway industry has at last reached its maximum and is now about to fall. The recent Court of Inquiry set up by the Ministry of Labor, it may be recalled, recommended that present wages should be stabilized till Dec. 31 next. In view of the reduction then beginning in the cost of living, the employers refused to accept the recommendation. A committee of Joint Industrial Council for the industry considered the position and on June 16 submitted recommendations to the council, and the latter body, with only one dissentient, adopted them.

The effect of the changes thus brought about is as follows: The present rate of wages will be maintained until the beginning of the first full-pay period in August, 1921. From that date reductions from and additions to wages will be at the rate of one shilling per week for each complete five points variation either way in the cost of living index figure (as published monthly in the *Labor Gazette*) commencing from the figure of 135 per cent over the August, 1914, cost of living. Thereafter, wages will be adjusted by this method every three months, the adjustment to be determined by the index figure for the month preceding. In the case of employees under eighteen years of age, the reduction or addition will be at the rate of 6 per cent per week for each five points variation.

The arrangement will be terminable by three months' notice from either side after Dec. 31 next. It will be seen that this scheme is in principle the sliding scale which has been in operation in a good many British industries for some time. For the last few months the index figure has been steadily, though not very rapidly, falling, and it is not probable that it will rise materially again.

In June more examples arose of the conversion of boilers in English tramway power stations for burning oil instead of coal. In this way various tramway services which had been cut down owing to the coal miners' strike have been brought back to something like normal. A notable case of recent conversion is that in the Greenwich station of the London County Council Tramways. Four Babcock & Wilcox boilers, each of 4,780 sq.ft. heating surface, have been changed over. Almost every day in the latter part of June announcements were issued by the steam railway companies of restoration of trains which had been withdrawn, this being rendered possible by the conversion of locomotives to oil burning. The day of the absolute monopoly of coal as a source of power in this country seems to be over. The only thing that can restore it to its old position is a great fall in its price and that seems unlikely soon.

The policy of increasing the fares on Glasgow Corporation Tramways has turned out a great success. The effect of abolishing the half-penny fare and slightly increasing other fares has been made fully manifest in the accounts now issued for the year ended May 31 last. During that period the revenue amounted to £2,392,853. This is an increase of £671,276 over the previous year. The total expenditure was £1,937,664, an increase of £379,503. The net revenue, including interest on investments, is £470,430, compared with £176,762. After setting aside £267,687 for renewal of track and depreciation, and charging rent of leased lines, interest, sinking fund, and income tax, there remains a net credit balance of £105,796.

For the previous year, after making the corresponding allowances, there was a deficiency of £108,531. It should be mentioned that the interest and sinking fund charges are very small as the capital expenditure on the undertaking had been cleared off in previous years. It is proposed to use the surplus to wipe off nearly the whole of the previous years' loss. Apparently the tramways have turned the corner.

The accounts of the London County Council Tramways for the year ended March 31 last are in strong and unhappy contrast to those of Glasgow. The deficit is largely due to the heavy capital charges, while in the case of Glasgow there are, as noted above, practically no capital charges. It was made known some little time ago that the London undertaking had a deficit of over £500,000 for the past financial year, and the details now available fully bears this out.

The total revenue was £4,904,427, being an increase (largely due to increased fares) of £608,581 compared with the previous year. The working expenses, however, increased in greater proportion, the total being £4,623,654, an advance of £942,745. The surplus on working was accordingly £280,773, compared with £614,937. From the latter sum in previous year nothing was deducted for expenditure on renewals, but after allowing for interest, sinking fund, income tax, etc., there was a deficit of £100,722. On the present occasion there is deducted for renewals from the surplus on working a sum of £215,639, leaving £65,134. The net charges against this sum (interest, redemption, income tax, etc.) amount to £655,714, so that the deficit is £590,580. By far the greater part of this is due to the capital charges. For the year now current it is estimated that the deficiency will be only £7,417, the expected improvement being mainly due to increased receipts.

Manchester Corporation Tramways accounts show a balance after meeting all charges, of £124,428, and most of this is set aside for renewals. For the first time for many years no part of the surplus has been handed over for relief of the local rates. The gross surplus was £305,834, compared with £379,632 in the previous year.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Norfolk Debates Franchise

### A. Merritt Taylor Says Service-at-Cost Is Not What It Pretends to Be —Incentive to Profit Lacking

The city of Norfolk, Va., is in the throes of a pre-election discussion of the franchise ordinance which has been proposed by A. Merritt Taylor, acting as a consultant for the city. Readers of the ELECTRIC RAILWAY JOURNAL will recall a series of articles last December which analyzed this rather interesting situation in Norfolk and reviewed Mr. Taylor's previous report on franchise bases, valuation, service requirements, and fares (see issues of Dec. 4, 1920, page 1125, Dec. 11, 1920, page 1186, and Dec. 25, 1920, page 1289. Since that time the actual franchise has been drawn up in line with the basis originally outlined. Among its provisions there are some which have been the cause for considerable debate between various groups in Norfolk. On July 24, Mr. Taylor discussed the franchise and answered his principal critics.

### FRANCHISE PROVISIONS REVIEWED

Some of the high points of the franchise which have caused this discussion are as follows:

A provision for a base valuation of $8,750,000, which lies between a Jan. 1, 1920, price of $11,815,399 and a Jan. 1, 1914, price of $6,368,671. This value includes $250,000 "going value," but this is to be raised to 15 per cent of $8,500,000 when the company's service is restored to first class condition. The company is to be allowed 8 per cent cumulative return on this rate base if it can earn it. All deficits in any year are to be added to the present rate base until amortized; in addition the company is to be allowed to earn the annual cost of capital invested subsequent to Jan. 1, 1920, plus a margin of profit of not less than 2 per cent.

A provision that trackless vehicles are to be installed on certain routes.

A provision that the "Grantee shall use and efficiently maintain the most approved fixtures and appliances in general use to prevent injury by electrolysis or otherwise to the water pipes and other public improvements of the Grantor," and shall pay for damages due to failure to comply with this provision.

A provision that the franchise shall run for thirty years; that the city will purchase from the Grantee its entire system at its then value at the end of the franchise term, except that if the city shall issue another franchise with practically the same provision, it shall not be compelled to buy. This particular arrangement is necessary to meet provisions of the Virginia constitution, which limits franchise terms to thirty years.

A provision for a local commission, which is to be advisory to the City Council and the city manager.

A provision that the rate of fare shall be on the flat rate basis, starting at 7 cents, with free transfers. But that this rate may be changed by the Council on its own motion, or at the request of the railway. But the railway shall always be accorded a hearing before a rate change and shall have the right after the ordinance has been in force a year to raise the rates if necessary to provide the returns specified.

Mr. Taylor's report discusses and defends these provisions and others and ends with a warning against municipal ownership and service-at-cost, in which he says:

> I hold no brief for suggestions which have been made tending toward municipal operation of your street railway system or municipal regulation of wages of street railway employees, and do not consider them subjects worthy of serious consideration in an enlightened community. I want to warn you that "service-at-cost" is a mythical expression. As business men, you surely recognize that any enterprise to be healthy must perform service not at cost, but at a reasonable profit.
>
> By critical investigation you will find that so-called service-at-cost contracts have either been brought about by unjust coercive methods pursued by cities, or contain an item of profit as an element of cost and are thus not what they pretend to be.

## Roads Centering at Indianapolis Cut Wages

Wage reductions of 3 cents an hour for motormen and conductors of the Indianapolis (Ind.) Street Railway, the Terre Haute, Indianapolis & Eastern Traction Company, the Interstate Public Service Company and the Union Traction Company of Indiana became effective on Aug. 1 with notices posted by these companies. Power house, shop and trackmen of some of the interurban companies were cut similar amounts.

It was said in notices posted by the Indianapolis Street Railway that the reduction was made necessary by a decrease of 44,000 revenue passengers daily caused by the continuance of unrestricted jitney bus competition and the present serious industrial depression. The interurban companies said they were compelled to reduce wages because business has fallen off.

The wages under the new scales of both the city and the interurban companies are far above pre-war scales.

The reduction made to platform men will not make up for the deficit caused by the falling off of business, estimated at more than $500,000. The platform men of the company formerly received 40 to 45 cents an hour, depending on the length of service, and interurban platform men from 42 to 47 cents an hour.

## Interurban Reduces Wages

Wages were reduced on Aug. 1 by the Union Traction Company, Anderson, Ind. The announcement was made on July 28. The new scale in cents per hour for trainmen operating city cars is as follows:

| | |
|---|---|
| First year | 30 |
| Second year | 31 |
| Third year | 32 |
| Fourth year | 33 |
| Fifth year | 34 |
| After fifth year | 35 |

Operators of one-man cars will receive 2 cents per hour over this scale.

The new scale of the interurban men is as follows:

| | |
|---|---|
| First year | 39 |
| Second year | 40 |
| Third year | 41 |
| Fourth year | 42 |
| Fifth year | 43 |
| After fifth year | 44 |

This is a flat reduction for both classes of service of 3 cents an hour.

## New Franchise Grant Presented at Fresno

The first draft of the proposed indeterminate franchise which the Fresno (Cal.) Traction Company is asking of the city of Fresno has been placed in the hands of city officials by the company. The offering of the franchise grant by the company follows negotiations with the city opened some months ago and is supposed to cover both the points desired by the city as well as those asked by the company.

After the franchise draft has been submitted to the city attorney for inspection, it will be considered by the commission as a whole. The company holds a number of franchises on different lines of the city for various terms from twenty-five to fifty years. These franchises expire at different times. The first grant to run out will expire in seven years. In the business sections generally the franchises still have about nineteen years to run.

The position of the company is that with these franchises running for what are called short terms the company cannot borrow the money needed for street work, extensions and improvements. With the indeterminate franchise the officials claim they will have no difficulty in securing whatever money is needed. Under the proposed grant service would be rendered at cost, a stabilizing fund of $25,000 being set up as the fare barometer.

## Concessions and Compromise Fix Award

The finding of the board of arbitration in the matter of wages on the Rochester & Syracuse Railroad, Syracuse, N. Y., was referred to in the ELECTRIC RAILWAY JOURNAL, issue of July 30, 1921. In detail the wages are as follows:

Motormen and conductors for the first six months of service have been reduced from 56½ cents an hour existing prior to May 1, 1921, to 46½ cents an hour. For the second six months of service the rate has been reduced from 58½ cents, existing prior to May 1, to 48½ cents an hour. Shopmen involved in the arbitration (except the nine car-cleaners and one watchman employed in the shops) were reduced 16⅔ per cent below the wages received prior to May 1.

This same ruling applies to substation operators, electrical repairmen, freight trainmen, ticket and freight agents.

Louis L. Waters, the neutral member of the board, declared in a statement that the amount of reduction was reached only by concession and compromise. That the financial showing of the company was not good, the arbitrators agreed. Still, Mr. Waters said the proposed 23.5 per cent reduction of the company and the 11.7 per cent reduction as seeming justified to the men did not seem a just award.

## Building Program Submitted by Company at Fort Wayne

In a letter addressed to the board of public works of Fort Wayne, Ind., the president of the Indiana Service Corporation, Robert M. Feustel, outlined the building program of the corporation for the next five or six years, showing extensive improvement requirements which will have to be made to meet the many transportation problems of the city during the period outlined. Among the things which Mr. Feustel's letter says must be done within this period are the following:

Abandon the line on Pontiac Street from Hanna Street to Anthony Boulevard in favor of a double-track line from Calhoun to Hanna Street, then out Hanna to McKee Street and from there to Wayne Trace.

Open Oxford Street in the southwestern section of the city to take care of the greatly increased population in that section. This would be entirely new trackage.

Double track Creighton Avenue from Calhoun to Fairfield Avenue. This to be done as soon as business becomes normal.

Extend a line into the Bloomingdale section of the city. This would involve the widening of Third Street from Franklin Avenue to Runion Avenue sufficiently to enable the company to lay double tracks on this street. Mr. Feustel recommends that the absolute minimum width of this street between curb lines be 34 ft.

Double track West Main Street from the new West Main Street bridge to the Lake Erie Railroad tracks, a distance of approximately 1 mile.

Extend the Columbia Street line across the new bridge over Delta Lake to Anthony Boulevard. This line should also be double tracked.

In his letter Mr. Feustel says:

While there is a considerable lull in our traffic at the present time which will require some curtailing of city service for the next few months this has nothing to do with what should be our possible long-time construction requirements covering a period of five or six years. In these difficult times it is of course necessary for us to conserve all construction funds and this outline of our future work is made only because we do not believe that payment should be placed or work should be done in these dull times in such a way that it will make it difficult or impossible to make the necessary transportation extensions in the future. We expect to make application for the suggested change of the Pontiac line at once and will follow with necessary petitions on the other locations as fast as the traffic requirements demand.

## Covington Employees Accept Cut

Employees of the South Covington & Cincinnati Traction Company, Covington, Ky., at a special meeting voted to accept a reduction of approximately 10 per cent in their wages. When the proposition was first presented to the men they voted it down and the selection of an arbitration committee was in progress when the employees reversed their decision. The new wage scale became effective on Aug. 3. Under the new scale the motormen and conductors will receive a maximum wage of 50 cents an hour.

**Railway to Build Park.**—The Philadelphia (Pa.) Rapid Transit Company is planning to build an amusement park on W. Market Street on the old Burd Home property. The company believes this project will beautify the section.

## Accident to Mule

### Texas Court Describes Principles of Mule Valuation, When Struck by Car—Mule Owner's Responsibility

The Northern Texas Traction Company now knows how much it costs to injure a mule. So does Mr. Stone, the owner of the mule. The question of mule valuation was the subject of extended litigation recently in Fort Worth, the case finally coming before the Court of Civil Appeals in Texas where a decision was given on May 26. The facts leading up to the litigation, as set forth by Judge Fry in his deciding opinion and repeated here in somewhat abbreviated form, follow:

This is a suit for $229, damages to a mule alleged to have been inflicted by plaintiff in error negligently running a street car against the mule, which with three others was tied to the rear end of a wagon, and being led along the streets of Fort Worth. The cause was submitted to a jury on special issues, and on the answers thereto judgment was rendered in favor of defendants in error for $201.

The jury found that the street car was running at a greater rate of speed than 18 miles an hour, and that this fact was the proximate cause of the injury to the mule, and that the mule was of the market value of $220 in Fort Worth, just before the accident, and $100 in West, after it had been hurt, and treated for its injury. It was also found that Stone expended $10 for his board and lodging in Fort Worth in order to treat and care for the mule, that medicine for the mule cost $2.50, and there was a charge of $25 for caring for the mule after it was sent back to West, and $8.40 for freight on the mule back to West. It required twenty-two questions to elicit this highly interesting instructive information about the manner in which the mule was hurt and the time spent and tender care lavished on the animal to nurse it back to health and efficiency. Not more than six questions would have been sufficient.

If the mule was injured through the negligence of plaintiff in error, the measure of damages was the difference between its market value in Fort Worth before the injury and the market value thereafter. If, however, there was no market value for the mule in Fort Worth, as Stone testified, after it was injured and he took the mule back to West and by care and attention restored the animal to such an extent that he sold it for $100, and that was the reasonable value, then the measure of damages would be the difference between the market value of the mule in Fort Worth before it was hurt and the reasonable value of the mule after it had been restored to partial usefulness, less the necessary and reasonable amounts expended in such restoration. While it is true that the measure damages would not be the difference in market value of the mule before injured in Fort Worth and the market value after it was restored to some efficiency at West still such rule would not injure plaintiff in error, because the evidence showed that the mule was worth more in West than it would have brought in Fort Worth. If defendant in error was acting properly in trying to minimize the damages by caring for the mule, he should be reimbursed for all reasonable sums expended in such care and attention, and that can be done by deducting these sums from the value of the mule after such care and attention.

The evidence, however, fails to show that defendant in error was acting reasonably; for, while he swears the mule was not worth a dime in Fort Worth after he was hurt, the uncontroverted evidence shows that defendant in error was offered $35 in cash for the injured mule in Fort Worth at the time of the accident, but he refused it and chose to take the risk of restoring it to its usefulness. In treating and taking care of the mule he expended more than four-fifths of his value after being restored and left only $19 to be credited to plaintiff in error on the original value. Defendant in error should pay for his mistake in endeavoring to cure the mule, and plaintiff in error, if liable at all, should have the benefit of the offer of $35, which would have reduced the damages to $185 instead of $201.

The next question considered was the issue submitted by the trial court of whether the motorman should not have given "such assistance to the plaintiff as was reasonably demanded by the circumstances to obtain clearance and avoid an accident." But the appellate court naturally declares that the hypothesis upon which this charge is based is not clear. On this point the opinion says, in part:

How the motorman, driving a street car, could give assistance to the owner of the lively young mule tied with three others to the rear end of a wagon is certainly not disclosed by any evidence and is not based on any law, statute or otherwise. If the court meant that the motorman should have stopped his car, if he saw the mule on the track, until it could be persuaded or forced to walk in a safer place, he ought to have said so. That part of the charge had no reference to the facts and could have no other tendency except to mislead the jury. It is followed by language that might lead the jury to believe that the street car ought to have steered around this unnatural animal "without pride of ancestry or hope of posterity," as an automobile would do; for that is what is meant by giving "such assistance * * * as the circumstances shall reasonably demand in order to obtain clearance and avoid accident."

The learned judge then considers whether the mule injured, or its owner, was guilty of contributory negligence, as well as whether the motorman could have avoided the accident by other means. On this point he says:

There was evidence tending to show that the mule was three or four feet from the track when the front of the car passed, and, as stated by one of the witnesses, the mules "were kind of gay." The evidence presents a picture of a countryman from the McLennan County village of West, coming into the stirring modern city of Fort Worth, with two mules drawing his wagon and four untutored country mules attached by ropes to the rear end of his wagon. To these denizens of the field and meadow, honking automobiles, clanging street cars, and the turmoil of modern commercial life were not only novel, but alarming, as they steered their perilous journey through the city, with their nerves keyed to a high pitch, until at last they reached a modern convenience called an aqueduct. But unknown to them, and while wending their perilous way through this labyrinthine passage, before they were aware of its approach, a huge vehicle flits by, as on the wings of the wind, and what more natural than that the nearest mule to this unknown vehicle should seek instantly to defend itself against what was deemed to be an attack upon its personal liberty, by using the effective weapons placed in its possession by nature? The jury found that the gay and festive mule did not kick the car, which they probably might do under the testimony, although no one acquainted with the total depravity and moral obliquity of the average mule would hesitate to credit the statement that the mule now under investigation administered a swift kick to the car as it was passing its ever-ready heels. There was direct testimony to this effect.

In conclusion the judge remanded the case for retrial, believing that the jury should have considered whether the plaintiff was not so much to blame for the injury as to absolve the railway company.

## Ford Hasn't Forgot Gasoline Trolley

In an interview appearing recently in the daily press, Edsel Ford, who is now president of the Ford Motor Company, is quoted as follows: "Father hasn't given up the gasoline 'trolley' car. It has been dormant for some time, but recently we ran one down the Detroit, Toledo and Ironton Railroad to Springfield. We believe it will solve many traction problems."

### Arbitration Award Accepted

Announcement has been made by officials of the Northern Ohio Traction & Light Company, Akron, Ohio, that the company's railway employees have agreed to abide by the wage award of the arbitration board. This board recently returned a finding fixing the rates of pay of the men from 1 to 2 cents per hour less than had been suggested by the company in its original proposal for a reduction in wages.

The opinion apparently prevailed among the men that the arbitrators to whom the wage matter was referred had been swayed in their decision by the offer made by the company originally to the men, for they asked A. C. Blinn, vice-president and general manager of the company, to set aside the arbitration findings.

This Mr. Blinn refused to do. He dismissed the contention that the wages awarded on his property were not comparable with wages paid on other properties, and said that "we must assume that neither the wage offered by the company nor the wage requested by the men had anything to do with the board's judgment as to what was a reasonable wage under all the circumstances."

He said, in conclusion, that to grant the request of the men to disregard the findings "would make a complete farce of the arbitration proceedings."

The details of the award were given in the ELECTRIC RAILWAY JOURNAL for July 9, page 68.

### Reduced Wages—One-Man Car Operation

Although union employees of the New Brunswick Power Company, St. John, N. B., have been on strike for several weeks the cars are operating and it is expected that the company will emerge from the struggle with a compact, efficient and loyal organization.

The labor controversy dates back to June 14 on which date the company's agreement with the union expired. The company gave the usual thirty days' notice that it did not intend to renew the agreement. Numerous consultations and meetings were held in an effort to institute a working agreement.

The company desired to reduce wages from 10 to 20 per cent. The men applied for a conciliation board which under the law must be considered before any lockout or strike can take place. The company declined to become a party to the board so the three members were appointed by the Minister of Labor. A verdict was brought in that wages should be reduced 5½ per cent, the one-man car should not be used, all employees should be taken back under the old agreement and that the loyalty stipulation should be ignored.

As a result of this decision the company notified its employees that commencing on June 28 a new scale would be instituted with deductions of 10 to 20 per cent in various departments and that the men would be treated on an individual basis. The former employees did not return, but the company got enough help to operate the cars to a limited though growing extent. The new scale runs from a 10 per cent to a 27 per cent reduction and one-man cars have supplanted the two-man car operation.

### British Columbia Company Seeks New Franchise

The British Columbia Electric Railway is negotiating a new franchise for the company on the mainland. In a nutshell, the franchise is a form of service-at-cost agreement, covering city and interurban railway, light, power and gas service. It provides for a maximum return of 6 per cent on the company's actual invested capital, as will be ascertained by a firm of auditors, but new capital may obtain a return of not more than 8 per cent.

At the same time the company is not allowed to charge more than its present fares and rates, with the exception that its car fares can go up to 7 cents cash or four tickets for 25 cents. The company has still its present remedies for inadequate fares on the interurban lines. It will be permitted to charge a 50-cent minimum monthly on gas bills.

The service-at-cost arrangement provides that forthwith and every three years hereafter, the books of the company are to be investigated by the firm of Price, Waterhouse & Company, accountants, and rates are to be fixed so as to pay no more than the rates of returns as stated above. If adjustments have to be made as between various rates, a board of arbitration is provided.

In order to avoid any inefficiency in operation which is apt to result from a straight service-at-cost franchise, the draft agreement provides that any balance over the stated rates of return is to be divided, one half going to the company as a reward for efficiency and the other half to remain on the books untouched to provide for decrease in rates in the next three-year period.

The franchise is indeterminate, in a similar manner as the present franchises. At the end of twelve years a conference may be called to vary the terms.

The company surrenders to the city or the government or any combination of civic and municipal authorities the right to buy, not only as regards the railway service, which was solely within their rights of purchase previously, but as regards the light and power and gas systems. They can also buy these separately, but they cannot buy everything but the railway and leave the company with that.

The franchise does not guarantee the company any return on investment. If the revenue is not sufficient for any reason, it is the company's loss.

In Vancouver and the municipalities the franchises are for a definite term, but at the end of that time, the company must either be bought out or the franchises automatically continue for another term.

### Montreal Working Toward Compromise

The wage situation between the Montreal (Que.) Tramways and its employees remained unsettled on Aug. 2, though negotiations were still continuing, with a prospect of amicable agreement. Following the visit to the city of Gideon Robertson, Federal Minister of Labor, and his conferences with both parties, the company offered to substitute a wage reduction of 12½ per cent for its previous proposal of a 20 per cent reduction on the prevailing scale, but without a contract for any specified period.

This proposal was discussed at a joint meeting of representatives of the company and the men's union, held on Aug. 1, at which a member of the Department of Labor staff represented the Minister.

The union representatives contended for a 10 per cent reduction only, with a contract, but the company stood firmly by its amended offer.

The meeting broke up with the understanding that another would be held before the end of the week, when the company is expected to state its final decision. Whatever the outcome may be of the present exchange of opinions, the matter will be submitted by the men's committee to a referendum vote of the union, the alternative issues being acceptance of the company's offer or insistence upon the appointment of a board of arbitration to decide the dispute.

### Gradual Rehabilitation in Salt Lake City

With a view to improving its property, and at the same time to enhance the appearance of the city streets, the Utah Light & Traction Company, Salt Lake City, Utah, has enlarged its force of workers and will spend $20,000 a month for the next several months in carrying out this work.

While heretofore there have been six gangs, consisting of forty-two men each, employed by the company in repairing the tracks and general improvements, twelve gangs, consisting of 126 men, are now employed, the object being to complete the work as soon as possible.

The enlarging of the force has been facilitated by a saving of $125,000 to the company as a result of the recent decision of the arbitration board, which stipulated certain reductions in the pay of employees. This money will be devoted exclusively to the above repair work.

It is believed that the company, in spending this amount will meet the wishes of the city, which has asked that improvements be made in the tracks and in paving.

The fares which have prevailed heretofore have failed to furnish sufficient revenue for the company to undertake any big program, but with the program now outlined it is thought that within two years the property will be thoroughly rehabilitated.

## San Francisco May Vote to Purchase Market Street Railway

The city of San Francisco began early in June an appraisal of properties of the Market Street Railway with the idea of putting the question of purchase definitely up to the voters of the city at the November elections. As the matter stands now, the procedure will be for the Board of Supervisors to decide, after the valuation, upon what they believe to be a fair price. If the voters indicate their willingness to pay that price there will then have to be settled the question of whether the company will accept the price and terms offered.

## Wages Again Reduced by International Railway

The basic maximum wage for trainmen of the International Railway, Buffalo, N. Y., will be reduced on Aug. 15 from 60 cents an hour to 55 cents an hour, with similar adjustments in the hourly rates paid other employees.

The company, desiring to put off the longest time possible any general reduction in wages, made certain adjustments as of May 1, 1921, and at that time stated that a continuance of the 60-cent basic wage was dependent upon an improvement in the revenue of the company. In announcing the wage cut the company said:

> Wages since May 1, 1921, have been very generally decreased elsewhere on street railways, and indications are that there will be further reductions in the future.
>
> Street car riding on the International system has been falling off at an alarming rate. The figures for May, June, July, 1921, as compared with 1920 are as follows:

| | Total Passengers Carried | | Decrease 1921 Under 1920 | |
|---|---|---|---|---|
| | 1921 | 1920 | Passengers | Per Cent |
| May.... | 18,158,661 | 19,194,767 | 1,036,106 | 5.40 |
| June.... | 17,529,883 | 19,007,069 | 1,477,186 | 7.77 |
| July.... | 17,375,454 | 19,994,294 | 2,618,840 | 13.10 |

> For the six months ended June 30, 1921, the company fell short by $916,683 of earning a fair return upon the value of its property devoted to the public service according to the formula adopted by the Public Service Commission when granting the 7-cent fare—four tickets for 25 cents.
>
> This great falling off in business must be met with a cut in operating costs.
>
> In addition to other economies there must be a substantial reduction in the payroll in order that the company's receipts may meet its expenses.

## Fund Raised for Paving Obligations

A plan to avert an impending crisis between the city of Cape Girardeau, Mo., and the street railway over an ultimatum delivered by the city in the matter of the paving of West Broadway is believed to have been devised. The City Commission ordered the Cape Girardeau-Jackson Interurban Railway to remove its tracks on that part of West Broadway for which paving contracts had been let, but the company has refused to act. E. A. Hart, general manager of the Cape Girardeau-Jackson Interurban Railway, has suggested that the city and civic organizations provide a fund of $8,200 to defray the expense of taking up the track and relaying it and for the purchase of four new cars. In return the company will agree to perform the work of removal and relaying the track and pay incidental expenses and will place the new cars in operation at once and will keep the system in satisfactory condition for five years.

## City Loses Suits to Recover

Supreme Court Justice Irving Lehman has denied the application of the city of New York to recover upward of $125,000 from the Interborough Rapid Transit Company because "bonuses, presents or honoraria" received by executives were charged against the city as part of the construction cost of subways under construction in 1913. In a similar action he decides that the city is not entitled to recover $1,990,800 from the New York Municipal Railways Corporation, the subway operating subsidiary of the Brooklyn Rapid Transit.

Justice Lehman points out that the agreement provided a time limit of thirty days in which protests against the decisions of Alfred Craven, the then chief engineer, were to be made.

## No Trolleys in Des Moines

Electric railway service in Des Moines, Ia., was suspended on Aug. 4, following a federal court ruling. Other carriers of all descriptions were rushed into service on Aug. 4 to provide transportation. The court had previously indicated that the shutdown would result unless some solution was found for the difficulties between the city and the Des Moines City Railway over jitney competition and other matters.

The immediate cause of the withdrawal of the trolleys was the inability of the company to operate successfully in the face of bus competition. Judge Wade said that the property could not be operated longer without prejudice to the bondholders.

P. H. Gadsden, president of the American Electric Railway Association, says that the suspension of the railway under orders of the federal court was due primarily to lack of adequate relief in the way of higher fares and "lawless competition" from jitney buses.

The troubles of the company at Des Moines were reviewed at length in the ELECTRIC RAILWAY JOURNAL for June 11. Developments since then were followed in the issue of July 23, page 144.

## Supplementary Bus Service Planned

The fare receipts of the Tulsa (Okla.) Street Railway on the East First Street division alone recently have been $200 a day less than they were a few months ago, due to jitney competition. It was erroneously stated in the ELECTRIC RAILWAY JOURNAL, issue of July 23, that the loss in receipts was $200 a month. The company contemplates the use of motor buses as a temporary experiment where it feels branch lines ought to be built and in order to develop the territory to the point where the permanent extensions are justified.

# News Notes

**Franchise Surrendered for Indeterminate Permit.**—The Terre Haute, Indianapolis & Eastern Traction Company, which operates the local system in Richmond, Ind., has notified the City Council there that it would surrender its franchise with the city of Richmond and operate in the future under the indeterminate permit issued by the Public Service Commission. A similar notice was filed with the county auditor of Wayne County at Richmond covering the operation of the interurban line from Richmond west to the Henry County line.

**Railroad Appeals Bridge Case.**—The Brooklyn (N. Y.) City Railroad has appealed to the Appellate Division from a decision of Supreme Court Justice Kelby appointing three commissioners to determine whether the city's plan to run cars across the Williamsburg Bridge is proper. The commissioners have reported favorably on the scheme. The company holds that the city has no franchise and no certificate of necessity for running cars on the bridge, and therefore it would be illegal. The corporation counsel's office contends that the city may operate across the bridge as a matter of right.

**Norwood Approves Franchise.**—The Norwood (Ohio) City Council unanimously passed the amended franchise ordinance recently submitted by the Cincinnati Ohio Traction Company, and which provides for the reduction in fares on August 1. The ordinance as passed is similar to that which was passed by Cincinnati City Council on June 14. The ordinance is to be effective whenever the Cincinnati ordinance under which fares are to be reduced becomes effective. The ordinance provides that the City of Norwood waive claim to the franchise tax, amounting to $6,000, until 1922.

**Prizes Offered for Suggestions**—Prizes of $15, $10 and $5 were recently awarded E. C. Hunsucker of the Charlotte street railway, R. T. Marlow and H. R. Johnson of the Winston-Salem railway property for the most valuable and timely suggestions affecting the street railway service of the Southern Public Utilities Company at its several branches. The first prize-winner emphasized courtesy and patience on the part of the employees. The second winner discussed the need for the establishment of a training school for new men and those who have been in the service less than two years and the last winner suggested that the first and main thing for a successful motorman was to learn to maintain schedules. The letters were published in the July issue of the Southern Public Utilities magazine.

# Financial and Corporate

## Utilities in Greater Favor

In its monthly survey of business conditions issued on July 25 the Guaranty Trust Company, New York, comments on the improved condition in the bond market and refers particularly in this connection to public utility issues. On this matter it says, in part:

> The market for public utility issues, particularly those of well-managed and conservatively financed power and light companies, has reflected the improved position of public service corporations. Gross earnings are showing an improvement, and, with the decline in labor and other operating costs, an even greater improvement is being shown in net earnings. Average earnings of 14 representative companies, as reported for April, 1921, showed gross earnings 16 per cent greater than for April, 1920. The corresponding increase in net earnings was about 24 per cent. With the growth of population in general and the increasing concentration in industrial centers that the last census indicated, the opportunity for expansion of public utility enterprises is such as to make probable increased development in this field.

## I. C. C. Allows Two California Short Lines to Quit

So far as known the first railroad to get the official count placing it in the down-and-out class from motor truck competition went out on June 21 when the Interstate Commerce Commission counted ten over two branch lines of the Ocean Shore Railroad in California. One line runs from San Francisco to Tunitas Glen in San Mateo County and the other runs from Santa Cruz to Swanton in Santa Cruz County. The official knockout of the railroad by the motor truck is contained in this decision of the Interstate Commerce Commission:

> Construction of the lines in question was begun in 1905 and completed in 1909, with some interruptions due to financial difficulties. The completed property was acquired by the applicant in 1911 in reorganization proceedings following a receivership. Gross revenues have never equalled operating expenses and a deficit amount to $407,848 at the close of the year 1920 has been met by assessments on the outstanding stock aggregating $29 a share. Traffic diminished progressively, chiefly because of increasing competition by motor vehicles. The territory served is devoted principally to agriculture and lumbering. No objection to the granting of the application has been filed with us. The record is clear that but little use has been made of the service in the past and that there is little, if any, prospect that the lines can be made to serve any useful purposes in the future. We, therefore, find that the present and future public convenience and necessity permit the abandonment of the lines.

## Receiver Resigns at Montgomery

Ray Rushton has resigned as receiver for the Montgomery Light & Traction Company, Montgomery, Ala., and S. B. Irelan, already holding the position of receiver for the Montgomery Light & Water Power Company, has been appointed by Judge Henry D. Clayton to succeed him.

Accompanying his resignation, Mr. Rushton submitted to the court a report in which he refers to the unsuccessful effort to secure the application of the service-at-cost plan, with a 10-cent fare to start, to the railway system. Regret is expressed by the retiring receiver at the opposition shown by the city commission of Montgomery to the plan and the failure of the Public Service Commission to apply it. He is of the opinion that the traction company cannot perform its functions and duties until some more reasonable plan is adopted than that now in force.

In the course of his remarks Mr. Rushton said:

> Your receiver has now served the court and the property for a period of two years and a half. During that time under the instructions of the court, everything has been done that was possible to rehabilitate the property and put it in a condition to meet its obligations to the public and its creditors, in the hope that the time would come when the owners would get some return from their investment.
>
> The Alabama Public Service Commission seems to be of the opinion that the public will be better satisfied with an inferior service and a lower rate. To this I cannot agree. It is true that there are some few citizens of Montgomery who probably approve of such a plan, but from an intimate contact with the patrons of the company, it is the opinion of your receiver that a large majority want good service and are willing to pay for its reasonable cost, but of such facts I have been unable to convince the commissioners.

## Fewer Passengers at Increased Fares

Effects of the increased fares on Glasgow Tramways are plainly visible in the following figures: During the financial year ended May 31 the traffic revenue of £2,388,444 showed an increase over that of the previous year of £671,953. On the other hand, the number of passengers, 447,601,811, showed a decrease of 61,738,075. The traffic revenue per car mile increased by 5.737d. (to 21.307d.) while the passengers carried per car mile decreased by 2.612 (to 16.638).

## Kansas City Road Making Progress Under Receivership

The steady progress of the Kansas City (Mo.) Railways under the receivership has been the subject of comment by Kansas City business men. The company is giving perhaps the best service in recent years, and despite the depression alleged to exist in business generally, is showing an increase in passengers carried over last year.

It is of interest that fully 85 per cent of the passengers are using tokens with which to pay fare—about 70 per cent paying with the metal tokens costing 15 cents for two, and 15 per cent using the tickets at 7 cents in lots of five or multiples thereof. While nominally a 7-cent fare prevails, the public does not take advantage of that privilege, but on the average pays more than 7½ cents.

The apparent satisfactory character of the progress being made is reflected in the absence of court proceedings often accompanying the operation of a receivership. It is inferred that the bondholders and the stockholders are equally content with the developments, and observe a unity of interest in the continuance of the present steps in the handling of the company.

## Another Drastic Financial Reorganization

### Key Route Plans to Cut Capital from $48,219,000 to $30,245,000 Including $1,500,000 of New Money

The financial structure of the successor company to the San Francisco-Oakland Terminal Railways will differ materially from that of the present company if the reorganization which is now planned is carried out unchanged. Moreover, the capitalization will be scaled many millions, for it is proposed to exchange $48,219,000 of the present securities for $28,245,000 of new securities.

The plan eliminates entirely the now outstanding $15,125,000 of common stock of the present company and places the stock control of the operating company with the holders of the prior preferred and preferred stock who formerly were the holders of bonds. Holders of present preferred stock to the extent of $13,050 000 will receive in exchange $6,525,000 of new common stock, or one share of common for two shares of preferred.

The proposed plan complies with the principles of reorganization approved by the Railroad Commission. As long ago as Aug. 11, 1919, that body indicated to the railway that the only permanent remedy for the financial difficulties of the company was a thorough-going reorganization. That the plan now advanced is such is indicated by the fact that whereas the total value of the property is $37,232,000, including $1,500,000 for betterments, there will be outstanding only $30,245,000 of stocks and bonds of the successor company. In this valuation no amount has been included to represent going concern, franchise or other tangible items.

The object has been to limit the prior preferred stock to an amount on which dividends may reasonably be expected to be earned from the beginning. On the basis of 1920 earnings, the amount available for interest and dividends of the reorganized company would be as follows:

| | | |
|---|---|---|
| Gross earnings | | $6,829,970 |
| Net before depreciation, but after operating expenses and taxes | | $1,579,218 |
| Bond interest | $612,331 | |
| Note interest | 216,000 | |
| Prior preferred dividend | 393,277 | |
| | $1,211,608 | 1,221,608 |
| Balance | | $357,610 |

The plan contemplates paying in cash all coupons on outstanding bonds maturing prior to Nov. 19, 1919, and funding all coupons due from that date up to the time of the distribution of the new securities. The upaid coupons, it is estimated, total $1,676,820. Of the new first mortgage issue, the first series of $2,500,000 is to be initially issued and sold, and of this the owners of the new common stock are to buy $1,000,000.

### Municipal Consent Necessary to Abandonment

The Board of Public Utility Commissioners of New Jersey has granted permission to the Bridgeton & Millville Traction Company to discontinue service and remove the tracks on the private right-of-way upon the line from the crossing of the Central Railroad on the Bridgeton turnpike in Tumbling Dam Park, Bridgeton. Providing the city assents, the company will also be permitted to remove the section of these tracks on the public highway. Authority to remove about 10 miles of track running between Newport, Port Norris and Bivalve has been denied by the commission. The commission stated in its opinion that the company did not consult any of the municipalities affected.

Abandonment of this section of the line, the commission pointed out, would eliminate the only electric railway communication between Bivalve, Port Norris, Dividing Creek and Newport, and also part of the line connecting Bridgeton and these points. Permission to abandon this section of the line, representing about 26 per cent of the revenue tracks of the company, was sought on the ground that its operation is not profitable. Some evidence of municipal consent must be presented, the decision of the commission stated, before such authority will be given.

### Little Rock Property To Be Appraised

The City Council of Little Rock, Ark., recently authorized C. E. Smith, St. Louis, to be retained to appraise the property of the Little Rock Railway & Electric Company in order to check up the company's recent report of its holdings and to determine if the company is entitled to an increase in fares from 6 cents to 7 cents.

The Council on July 7 refused permission to the company to collect a 7-cent fare. The company then filed suit in the Second Division Circuit to restrain the city from prohibiting the collection of the advanced rate. It also asked for a temporary restraining order which would prevent interference during the pending of the suit.

The work of starting the valuation depends upon the action of Judge Guy Fulk in fixing the date of hearing the petition of the company for the order to prevent the city authorities from interfering with the proposed increase in fares. The city authorities want the work to begin as soon as possible, so that the city can perfect its defense against the proposed increase in railway rates.

## Traffic Ratios Computed

### Tabulation Shows Results from 154 Companies Made by American Electric Railway Association

The Bureau of Information and Statistics of the American Electric Railway Association has made public the results of a recent study on traffic statistics of 154 electric railway companies. These figures are given in the accompanying table. Further explanation made by the Bureau in regard to some of the figures follows:

Certain of the companies in the city groups also do some interurban service, but it is impossible to segregate the statistics. Where there are two or more companies in a city, the figures from all were used to determine the average revenue passenger ride per inhabitant. Where this was not possible, the figure was rejected. The averages on rides per inhabitant are omitted from the interurban group because the tributary population could not be determined. As methods of counting passengers on interurban lines vary, the figures on numbers of passengers on these roads are not comparable. The table is made up from a table of statistics obtained from 154 individual roads, and the figures given as averages in the respective groups are the arithmetical averages of the figures for the roads in that group taken individually, and not the weighted average for each group taken as a whole.

AVERAGE SERVICE RATIOS OF CITY AND INTERURBAN COMPANIES GROUPED ACCORDING TO NUMBER OF CARS OPERATED

| | City Companies Operating | | | | Interurban Companies Operating | | | |
|---|---|---|---|---|---|---|---|---|
| RATIOS | I 1 to 50 Cars | II 50 to 250 Cars | III 250 to 1,000 Cars | IV 1,001 or More Cars | I 1 to 10 Cars | II 10 to 25 Cars | III 25 to 75 Cars | IV 76 or More Cars |
| Average number of properties analyzed | 23 | 31 | 14 | 7 | 13 | 16 | 13 | 8 |
| Revenue passenger rides per inhabitant per year | 133 | 288 | 317 | 369 | ..... | ...... | ...... | ...... |
| Index* | 100 | 216 | 238 | 278 | ..... | ...... | ...... | ...... |
| Revenue passengers per car-mile | 5.25 | 6.21 | 6.76 | 6.75 | 2.02 | 2.47 | 3.51 | 4.53 |
| Index | 100 | 118 | 129 | 129 | 100 | 122 | 174 | 224 |
| Revenue passengers per mile of single track | 205,900 | 263,500 | 464,000 | 515,000 | 31,170 | 36,400 | 74,000 | 147,100 |
| Index | 100 | 128 | 226 | 251 | 100 | 117 | 117 | 473 |
| Car-miles per mile of single track | 36,650 | 42,100 | 69,900 | 73,900 | 13,940 | 15,670 | 18,170 | 28,750 |
| Index | 100 | 115 | 191 | 202 | 100 | 112 | 112 | 206 |
| Passenger revenue per revenue passenger, cents | 0.0658 | 0.066 | 0.063 | 0.0705 | 0.224 | 0.242 | 0.154 | 0.092 |
| Index | 100 | 100 | 95.7 | 107 | 100 | 108 | 68.4 | 41.1 |
| Car-miles per passenger car | 44,900 | 46,850 | 43,100 | 39,500 | 58,700 | 79,700 | 63,400 | 56,170 |
| Index | 100 | 104 | 96.0 | 87.9 | 100 | 136 | 108 | 95.7 |
| Revenue passengers to total passengers carried [per cent] | 92.35 | 86.45 | 80.8 | 79.5 | 96.6 | 95.3 | 93.1 | 89.97 |
| Index | 100 | 93.7 | 87.5 | 86.1 | 100 | 98.7 | 96.4 | 93.1 |
| Car-miles per car-hour | 8.55 | 8.94 | 8.88 | 9.05 | 13.26 | 13.89 | 11.43 | 11.19 |
| Index | 100 | 105 | 104 | 106 | 100 | 105 | 86.4 | 84.5 |

*This index is obtained by assuming the value of the ratios in Group I as 100 and calculating the proportional deviation of the other groups.

### Earnings Shrink in Cleveland

The Cleveland (Ohio) Railway in June carried 4,759,616 fewer riders than it did in the same month a year ago. This is a loss of 12.59 per cent and is the most serious decrease in traffic sustained by the company since the present business depression. In June, 1921, the company carried 33,047,581 riders as against 37,807,197 in June of 1920.

As a result of this big falling off in the number of riders, the company for June showed a deficit of $44,953. The company's passenger revenue in June was $1,417,120, a decrease of 2.37 per cent over June, 1920, when the rate of fare was only a nickel cash or five tickets for a quarter as against the present 6-cent fare or nine tickets for 50 cents.

The company's interest fund, which is the fare barometer, showed a deficit of 67,006 on July 1. The company's maintenance, depreciation, and renewal reserve account shows a current over-expenditure up to the present time of close to $500,000.

Because the company is unable to secure new capital, owing to the city's refusal to increase the company's dividend rate from 6 per cent to 7 per cent, and the company's inability to sell its present 6 per cent stock at par, the directors have authorized the officers of the company to take the funds for all expenditures for new work, that should come from new capital, out of the maintenance allowance until such a time as conditions made it possible to attract new capital.

### Negotiations Under Way to Strengthen Property

Interest due on May 1 on the $3,979,000 of outstanding first mortgage 5's of 1937 and the quarterly interest due on June 1 on the outstanding $650,000 of 7 per cent notes of the South Carolina Light, Power & Railways Company, Spartanburg, S. C., have been defaulted. The company passed into receivers' hands last February. It is believed that arrangements will be carried through that will obviate the need for foreclosure and sale of the property.

The present plan is to have the people of Spartanburg vote on an increase in gas and electric light rates and the power consumers will be asked to enter into contracts for the rates as allowed by the court. An effort will also be made to obtain an increase in railway fares.

### An $8,000 Increase in Income

The June report of the Public Service Railway, Newark, N. J., shows an increase in the net income of $8,901 over June, 1920. The net for June, 1921, was $13,016. In the matter of traffic the railway carried 37,292,708 passengers, of whom 30,246,530 were revenue passengers and the others transfer passengers paying 1 cent each.

The revenue from both these classes

of passengers amounted to $2,162,948. However, the revenue would have been increased by $68,000, it is estimated, if the new rate for transfers, namely, 2 cents, had been in effect. This is assuming that the increased transfer charge would not have decreased the number of transfer passengers.

The average fare per revenue passenger including transfer passenger was $0.07151 during June and the revenue per car-mile was 45.4851 cents.

## Financial News Notes

**Stock Dividend at Detroit.**—The Detroit (Mich.) United Railway has declared a dividend of 2½ per cent, payable in stock on Sept. 1 to stock of record of Aug. 16. This is a stock dividend similar to that declared three months ago.

**Eureka Bonds to be Offered**—The city of Eureka, Cal., which recently took over the property of the Humboldt Transit Company has been authorized by the citizens to float a bond issue of $130,000. The property was valued at $75,000 and the remaining $55,000 will be used for extensions and betterments.

**Receipts Decline in East St. Louis.**—The receipts per day of the East St. Louis & Suburban Railway, East St. Louis, Ill., passenger department declined since January from $3,490 to $2,740, or a falling off of 21 per cent. The East St. Louis Railway shows a similar decline since January from $3,150 to $2,450, or 22 per cent.

**Belgian Company Extends Its Activities.**—The Compagnie Générale de Chemins de Fer Secondaires of Brussels, has changed its name to Compagnie Belge de Chemins de Fer et d'Entreprises. The company proposes to operate as a contractor and as promotor of light railways in countries both in and outside of Belgium.

**No Bidder for Georgia Property.**—Although it was announced some time ago by Judge B. D. Evans of the United States Court for the Southern District of Georgia that the City & Suburban Railway, Brunswick, Ga., would be sold as a going concern to the highest bidder, no bid for the property was received at the sale on July 5. The line will probably be sold as junk.

**Municipal Railway Increases Gross.**—Municipal railway earnings at Tacoma, Wash., during the month of June were $8,576, as against $8,096 for May, $8,492 for April and $8,273 for March. There was an average of 7,258 passengers carried during week days, as against an average of 7,124 for May, indicating a slight resumption in the tideflats industries which feed the municipal line.

**$992,000 of Notes Approved.**—Permission to the Cincinnati (Ohio) Traction Company to use the proceeds from a bond issue of $992,000 of 7 per cent notes for improvement, if the notes are purchased by the Cincinnati Street Railway, has been granted by the Ohio Public Utilities Commission. It is expected that the notes will be issued at once, as the traction company has been awaiting the decision of the state commission to act.

**Objection to Separate Foreclosure.**—The Guaranty Trust Company, New York, N. Y., has filed a bill in the United States District Court taking exception to the decision of Judge Orr, in which he rules that the Southern Traction Company, one of the three underlying companies of the Pittsburg Railways may foreclose on the mortgage and operate its West End lines independently. It is contended that any such action might delay the proposed reorganization plan.

**Would Extend Notes at Increased Rates.**—The Interborough Rapid Transit Company, New York, N. Y., has applied to the Transit Commission for permission to extend the date of the maturity of $39,416,000 of its notes for one year from Sept. 1 next, and to increase the interest rate from 7 to 8 per cent. It was explained that the condition of the money market would make it difficult to obtain an extension of time at the present interest rate, and that the inability of the company to meet the notes made an extension imperative.

**Request to Issue Notes and Bonds.**—The Indiana Railways & Light Company, Kokomo, has filed a petition with the Public Service Commission of Indiana asking for authority to issue and sell $250,000 of its first collateral gold notes and to issue $424,000 of its first refunding mortgage bonds for the reimbursement of its treasury and for permission to use the bonds as collateral security. According to the petition the money is required to reimburse the treasury for expenditures made for the improvement of the company's properties.

**$573,169 Increase in Tube Balance.**—The Hudson & Manhattan Railroad, operating under the Hudson River between New York City and New Jersey, reports for 1920 gross operating revenues of $9,016,253, against $7,978,910 in 1919, and a balance after interest and reserve for contingencies of $596,730, compared with $23,561 in the previous year. After deducting full interest on adjustment, income 5 per cent bonds in 1920 there was a deficit of $1,058,370. The net income from railroad operations for the year was equal to 3.55 per cent on the outstanding debt allocated to railroad operations.

**Payment Announced on Income Bonds.**—The directors of the Hudson & Manhattan Railroad, New York, N. Y., have declared an interest payment of 2½ per cent on the company's $33,102,000 of 5 per cent adjustment income bonds, payable on Oct. 1, 1921, out of the surplus income for the six months ended June 30, 1921. This is the second installment of interest to be paid on these bonds since Oct. 1, 1916, the first installment of 2 per cent having been paid on April 1, 1921. As the interest on these bonds is cumulative after Jan. 1, 1920, a balance of 3 per cent of cumulative interest remains unpaid.

**Service Must Be Resumed.**—The Board of Public Utility Commissioners has ordered the Jersey Central Traction Company, Keysport, N. J., to resume operation of its cars on Carr Avenue, Keansburg, Monmouth County. The traction company submitted an application to the board providing for the removal of their tracks on Carr Street, claiming that the cars were operated only during the summer months and that even then the traffic was very light. The Utility Board held that the continuance of the Carr Avenue line was necessary in order that adequate and proper service be provided.

**$12,800 Earned in Salt Lake City.**—The Utah Light & Traction Company, Salt Lake City, Utah, earned a balance after depreciation of $12,800 for the year ended Dec. 31, 1920, compared with $29,355 for the previous year. Gross earnings were $2,069,482, and net earnings $580,199. Other income was $401,748. After paying interest on bonds and making other deductions the balance was $157,525. Against this sum $144,725 was set aside for depreciation. The total number of passengers carried in 1920 was 40,512,223, compared with 39,521,505 for the previous year. The number of car miles in 1920 was 5,316,917, and in 1919 5,303,783.

**Commonwealth Company Prospects Improve.**—George E. Hardy, president of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., says, with some improvement in market and financial conditions and taking into consideration the company's present earnings position, it should be possible in the near future to formulate a plan looking toward the liquidation of the floating and other short-time indebtedness. The company reports net income for June, available for dividends, replacements and depreciation, of $164,386 against $8,398 in June, 1920. The account for the six months totals $1,524,532, compared with $1,207,941.

**Suit Brought Over Rentals.**—The Ninth Avenue Railroad, New York, N. Y., has brought action against the Forty-Second Street, Manhattanville & St. Nicholas Avenue Railway and the Third Avenue Railway in the Supreme Court. The plaintiff alleges that annual rentals for the use of the track on Broadway between Sixty-first and Seventy-first Streets, which were to continue for an indefinite period, stopped on Dec. 1, 1919, and obligations amounting to $42,000 have since accrued. The agreement involved was made on Dec. 1, 1897, between the defendant and the Metropolitan Street Railway.

# Traffic and Transportation

## New Fares in Winnipeg

### Long Litigation Over Commission's Jurisdiction Settled Amicably—Other Matters Being Negotiated

Negotiations between the Winnipeg (Man.) Electric Railway and the City Council of Winnipeg, which have been in progress for some months past have consummated in the passing by the City Council of an agreement with the railway which puts an end to the fare controversy and all litigation connected therewith, stabilizes relations between the company and the civic authorities, and augurs well for harmony and continued co-operation between the company and the city in the future.

As reported in the ELECTRIC RAILWAY JOURNAL previously the Public Utilities Commission of Manitoba granted the company, on three different occasions, higher fares. Exception was taken by the City Council to the final order, which was made Aug. 20, 1920, giving the company a 7-cent cash fare, four tickets for 25 cents, seven children's tickets for 25 cents and abolishing cheap workmen's fares. Holding that the Public Utilities Commission had no jurisdiction to alter fares which were stipulated in the original franchise, the City Council went to the Appeal Court of Manitoba to have the order set aside. A unanimous decision of the Appeal Court given April 4 last, upheld the commission's order, ruling that the commission had such jurisdiction. The City Council therefrom decided to carry its case to the Privy Council in London, England. In the meantime, however, the Council appointed a special sub-committee to try to effect a settlement.

As a result of conferences attended by A. W. McLimont, vice-president and general manager of the railway, the counsel for the company and members of the sub-committee, an agreement was drawn up between the company and the sub-committee, which agreement was ratified by the City Council and came into effect on Aug. 1. This agreement restores the by-law which incorporated the franchise as being "in full force and effect except as to fares" and placing the by-law and all agreements and dealings between the city and the company beyond the jurisdiction of the Public Utilities Commission. Under this agreement the Council agrees to a revised rate of fares (now in effect) and provision is made for an annual revision of fares by arbitration, if necessary, the arbitrators to decide a just and reasonable fare, having regard among other things to the value of the property.

The revised rate of fares which went into effect on Aug. 1 maintains the 7-cent cash fare, with four tickets for 25 cents, provides for a 5-cent cash fare on Sundays, nine tickets for 50 cents on week days between the hours of 6 to 8 a.m. and 5 to 6:30 p.m., while school children's tickets are eight for 25 cents as against seven for 25 cents which previously obtained for school children.

Negotiations between the company and the city will be continued with a view to settling all matters regarding which the city and the company are at present at variance.

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## Low Fare Test Fails

### Experiment in Cleveland With 2½-Cent Fare Will Undoubtedly Be Discontinued

The experiment of the Cleveland (Ohio) Railway in trying to stimulate riding by reducing the rate of fare in a limited zone in the down town section of Cleveland has not been a success. That was the announcement made by John J. Stanley, president of the company, to his board of directors at the meeting on July 28.

The experiment of charging 3 cents cash or a 2½-cent ticket rate of fare in the down town part of the city in a prescribed area was sanctioned by the City Council at the suggestion of Fielder Sanders, city street railway commissioner, for a thirty-day test, starting July 11. The new rates most likely will be discoutinued at the end of the thirty days. Mr. Stanley said:

> The result has been very disappointing because we believed that we might boost our revenues by getting the riding habit instilled into down town shoppers.

Here are the figures showing the number of riders who availed themselves of the 3-cent cash or 2½-cent ticket rate in the zone area during the first two weeks of the experiment:

| Date | Ticket Riders | Cash Fares | Total |
|---|---|---|---|
| July 11 | 8,710 | 8,216 | 16,926 |
| July 12 | 10,145 | 8,499 | 18,644 |
| July 13 | 10,040 | 8,115 | 18,155 |
| July 14 | 11,104 | 7,645 | 18,749 |
| July 15 | 10,374 | 7,944 | 18,318 |
| July 16 | 8,334 | 7,731 | 16,065 |
| July 17 | 2,367 | 3,247 | 5,614 |
| July 18 | 10,747 | 6,914 | 17,661 |
| July 19 | 10,529 | 7,410 | 17,939 |
| July 20 | 10,307 | 6,562 | 16,969 |
| July 21 | 10,408 | 6,646 | 17,054 |
| July 22 | 10,162 | 6,856 | 17,018 |
| July 23 | 8,227 | 6,600 | 14,827 |
| July 24 | 2,812 | 3,698 | 6,510 |
| July 25 | 10,078 | 6,416 | 16,494 |

The city street railway commissioner had estimated that at least 20,000 riders would avail themselves of the low fare every day, but as the figures indicate, at no time did the total number even go as high as 19,000. This means that the company is actually losing money, because most of those who availed themselves of the low fare would probably have ridden at the regular fare of 6 cents, company officials say.

## Sioux City Favors Railway

### Council Refuses to Issue Licenses—Jitneys Cease Operating—Court Sustained City

The City Council of Sioux City, Ia., has recently ruled that jitneys shall not operate in that city. The jitney operators have attempted to enjoin the City Council from arresting an operator who might run without a license. The court refused to grant such an injunction. Then the operators commenced action to compel the Council to grant licenses. A hearing was had in this matter and the court also refused to grant this relief.

The jitney problem in Sioux City dates back to the winter of 1920 when the General Assembly of the State provided that no jitneys could operate in an Iowa city without license and made it an indictable misdemeanor for them to do so. This act of the Legislature also provided that the City Council might accept or reject the application for such licenses.

Before the present action of the City Council, there were perhaps forty to fifty jitneys operating in Sioux City. The jitneys were making the short hauls and operating upon the streets which were already served by the street cars. The jitneys were taking perhaps $100,000 to $150,000 each year from the railway. The railway was charging a 6-cent fare, which had been voted by the people at a special election to amend the franchise. The original franchise provided for a 5-cent fare.

#### COURT ALLOWED SEVEN-CENT FARE

With the increase of freight rates and the increased cost of labor, this jitney competition made it entirely impossible for the railway property to meet operating expenses. No dividends had been paid since 1918. It was necessary, then, for the company to eliminate the jitney, or obtain higher fares. Accordingly, action was instituted in the Federal Court of Sioux City to enjoin the City Council from enforcing the 6-cent provision of the franchise on the theory that, because of these conditions above enumerated, it had become confiscatory and therefore in violation of the Federal Constitution. The Federal Court granted a temporary writ of injunction and authorized the company to charge a 7-cent fare. The company operated under this for thirty days.

When the Chamber of Commerce appeared before the City Council and asked that body to refuse licenses to jitney operators in order that the railway might receive the money otherwise taken by the jitneys, and thus accomplish a final reduction of the railway fare, the Council refused to license jitney operators further, and arrested those operating without license. As a result no jitneys have been operated since that time.

The railway then entered into a stipulation with the City Council, defendants in the injunction proceeding, to the effect that the court might decree in the said proceeding that the railway should sell four tickets for 25 cents, this order to be effective so long as jitneys were not running; a single fare to remain at 7 cents.

### Reduced Token Fare in Washington

In accordance with a recent ruling of the Public Utilities Commission of the District of Columbia a reduced rate of fare which will be applied uniformly to the several railways operating in the District of Columbia will become effective on Sept. 1. The cash fare will remain at 8 cents with a reduced token fare from 7½ cents to 7 cents. The present 1-cent charge for inter-company transfers and the existing free transfer privileges will continue.

The following properties are included in the ruling: Washington Railway & Electric Company, the City & Suburban Railway, the Georgetown & Tennallytown Railway, the Washington Interurban Railroad, the Capital Traction Company, the East Washington Heights Traction Railroad and the Washington - Virginia Railway. The ruling will continue in force until March 1, 1922, when, unless the commission rules otherwise, the initial rate of fare will be restored to that in effect on Oct. 18, 1919.

The commission in its findings stated that it was highly desirable in the public interest to maintain a uniform rate of fare to prevent a disarrangement of railway service disastrous to both the companies and the public. For this reason the commission believed that it could not reduce fares on the Capital Traction Company's lines and at the same time continue the presnt rates on the lines of the Washington Railway & Electric Company.

The commission stated further that it was its opinion that no appreciable relief from the present state of affairs, whereby one company receives less than a fair return and the other an excessive return, can be obtained unless some new ruling on taxation is formulated or until a merger is brought about.

### Connecticut Jitneys to Run Unmolested Temporarily

Unlicensed jitney operators in the State of Connecticut have until Aug. 16 to continue running buses unimpeded. Judge Thomas of the United States District Court issued an injunction on July 30 which terminated the jitney ban temporarily and prevented the police authorities from making arrests. The ruling is the result of the claim on the part of the busmen's attorneys that the men's constitutional rights were being invaded.

Judge John E. Keeler of the Superior Court had previously refused to issue an injunction to prevent the police from interfering with the jitney men who had been refused licenses by the Public Utilities Commission and the men proceeded with their case through the state ciriminal and the supreme court and also through the federal court.

The case will be heard at New Haven on Aug. 16 before a special court of the United States. Circuit Judge Wade Rogers will preside and with him will sit Judge Thomas of the Connecticut District Court and another district judge not yet selected. If the federal judges should decide in favor of the busmen the then prosecutions in the lower court will cease instantly. If, on the other hand, the case goes against the bus operators then criminal proceedings will be started at once.

In New Haven the jitneys will be operated on a 5-cent fare basis pending settlement. A session will be held in Bridgeport to discuss, among other things, the fare question.

### Increased Transfer Charge in Effect in New Jersey

New rates went into effect on Aug. 4 on the lines of the Public Service Railway in New Jersey in accordance with the order of of the Board of Public Utility Commissioners rendered July 14. As indicated in the ELECTRIC RAILWAY JOURNAL for July 16, the board found and determined that the rate which had been charged by the company for transfers was insufficient and ordered the company to charge a fare of 7 cents where 7 cents had been charged and to charge 2 cents for a transfer where a charge of 1 cent had previously been in effect.

According to computations by the commission, the extra charge of 1 cent for a transfer will afford a yearly increase in receipts to the company of about $715,000. It is also held that this increase, together with the reduction in cost of operation and wages and other adjustments in operating expenses, as found by the board, will produce a sufficient revenue to enable the company to meet all its requirements for operating expenses, taxes and depreciation and will afford a reasonable return upon the value of the property.

The commission estimates the number of passengers to be transported for the year beginning Aug. 1, 1921, as follows:

| | |
|---|---:|
| Base rate fares | 361,130,000 |
| School fares | 5,300,000 |
| Total first fares | 366,430,000 |
| Transfer fares on 2-cent basis | 75,000,000 |
| Total of all fares | 441,430,000 |

As has been indicated previously the board found the fair value of the property for rate-making purposes to be $82,000,000, after considering all the evidence in the case relating to value, the historical cost, cost of reproduction new, accrued depreciation, appreciation, going value, contingencies, cash working capital, materials and supplies and all other elements of value, tangible and intangible.

The board considers a return of $5,842,500 a fair return on the $82,000,000 valuation, this return amounting to more than 7 per cent upon the valuation.

### Emergency Fare Hearing Continued

Hearing of the petition of the Minneapolis (Minn.) Street Railway before the State Railroad & Warehouse Commission for an emergency increase in its rate of fare from 6 cents to 7 cents and four tickets for a quarter was continued from July 26 to Aug. 23 after a half-day session. The matter was put over at the request of the representatives of the city government that they were not prepared to present their argument. A representative of organized labor made a verbal statement against the proposed increase. He was asked to file a brief along with the other parties to the hearing.

Horace Lowry, president of the railway, said that before the war the company earned from $1,800,000. Earnings have, however, fallen off to about $1,100,000 a year. He said that Minneapolis in 1918 valued the street railway property at $24,000,000, and since then the value had increased $1,000,000. The book value of the property is $29,500,000. He said:

> We pay taxes on a valuation of about $23,000,000. On that investment a return of $1,000,000 is only about 4 per cent. Present earnings at a 6-cent fare are inadequate. We have $5,000,000 of bonds maturing next January on which we are paying 7 per cent interest. Unless we get money to pay the bonds an extension of the time they run will be necessary, and financial men tell us that extension will mean an addition of about 2 per cent interest. It is vitally necessary for the street railway to get on a financial basis to do refunding and provide money.

The commission denied the plea of City Attorney C. D. Gould for dismissal of the case on the ground the commission had no jurisdiction. This plea may be made later through the courts to test the law passed by the 1921 legislature putting trolley rate making under the jurisdiction of the commission.

The hearing on the appeal of the St. Paul City Railway for an emergency rate of 7 cents has also been put over until Aug. 23.

### Eight Cents in Cincinnati

Fares were reduced half a cent to 8 cents and the "pay-as-you-enter" system was re-established on lines of the Cincinnati (Ohio) Traction Company on Aug. 1. Reduction in fares was accomplished by an ordinance passed recently by the City Council modifying the company's franchise.

For the next three months the fare will be 8 cents for adults and 4 cents for children ten years and under. The return of the "pay-as-you-enter" system is due to trouble experienced through congestion at certain points under the "pay-as-you-leave" system.

Attempts on the part of the Citizens Committee to stay the reduction in fares until after the November election were foiled when the city appealed to the courts and got a decision to the effect that the ordinance was not subject to a referendum vote. A suit is pending in the Ohio Supreme Court relative to the matter. It will be heard within a few weeks.

### Utility Law Questioned

Wording of the Public Utilities Act of 1911 as amended by the 1921 Legislature was questioned before Chief Justice Gummere at Newark during the hearing of an application by the New Jersey & Pennsylvania Traction Company, Trenton, N. J., for a writ of certiorari enjoining the Public Utility Commission from suspending the ten-cent fare application of the company another three months.

The chief justice told L. Edward Herrmann, counsel for the board, that the language of the law was ambiguous and that the commission should seek to have the Legislature clarify it. The law, according to Herrmann, gives the commission the right to suspend a rate for six months. The company and the chief justice disagreed. The chief justice allowed the writ of certiorari, but refused to issue an order enjoining the commission's suspension, because Mr. Herrmann said the commission would be prepared to render a decision on the dime fare application by Aug. 10. The company operates between Trenton and Princeton.

### Reduced Fare Results Disappointing

City officials in Kalamazoo, Jackson, Battle Creek and Lansing, where 6-cent fares went into effect on July 1, see danger of a return to higher fares as a result of reports submitted by the Michigan Railway, the operating company, giving the total fares collected during the period of the new fare.

The report will show that during the second week of the trial total fares were smaller than in the corresponding week a year ago. Greater use of automobiles in spite of the business depression is considered the cause for the decline in the railway patronage.

At the time the reduced fare was granted the four cities by Manager J. F. Collins, it was intimated that the continuance of the reduction must be dependent upon an increase in fares collected and the corresponding increase in the company's revenue. The cities are determined to insist that the lower fare be continued until a thorough trial has been effected. Competition by jitneys is playing an important part in the discussions between city and company.

Lansing, where success was claimed by city officials for the first two weeks of the experimental reduction in fares, now has under consideration a project calling for the operation of motor buses as tributary to the electric lines, with transfer privileges from bus to bus and car to bus, or vice versa. This proposition has been put forward as one solution to the present jitney competition, for it will enable the railway to serve those parts of the city which are not now tapped by the car lines and thus defeat one of the chief sources of strength of the jitneys.

The reduction in fare is from 10 cents to 6 cents, with nine tickets for 50 cents. The cut in fares came after the city officials had firmly demanded some reduction which was granted by General Manager Collins on June 30. In his letter granting the reduction Mr. Collins asked that the committee of the City Council having the matter within its jurisdiction investigate the affairs of the Michigan Railway, the operating company, and audit the books.

## Eight-Cent Fare Asked

### Indianapolis Street Railway Sees in This Rate Its Only Hope—Suicide, Says City

The presentation by the Indianapolis Street Railway of a petition for an 8-cent fare with a 2-cent transfer, the assertion by Samuel Ashby, Corporation Counsel, that "Well, we're not going to have an 8-cent fare in this city if we have to turn the whole thing over to the jitney buses," and the presentation by company officials of a tale of financial woes based on a mass of statistics marked the conference on July 29 of members of the Public Service Commission, officials of the city and officers of the company on the street railway situation. The conference lasted about two hours.

After H. H. Hornbrook, attorney, had finished presenting the company's petition for an increase in fare, Mr. Ashby said:

> It occurs to me that if the Indianapolis Street Railway was deliberately trying to ruin itself it couldn't have devised a better scheme than such a petition under such conditions as we have now. A fare such as that suggested would not have a tendency to help this situation. Why, it's almost suicidal. It would effect an increase in the jitney competition and ruin the company.

Then Mr. Ashby said there must be no such thing as an 8-cent fare.

Mr. Hornbrook replied that there was no alternative for the company other than to ask for a rate sufficient to support it. He said jitney competition was authorized by the city. Mr. Ashby said the Council had expressed the intention of curbing the competition. Ferdinand Winter, also counsel for the company, said that since last spring the City Council had been deliberating about what it should do, and that meanwhile the company had been losing $1,000 a day.

The result of the conference was that the commission took the evidence presented to it under advisement and retired.

Joseph McGowan, treasurer of the company, was the only witness on the stand. He presented figures to prove that jitney competition is growing worse all the time. He testified that the June business was $965.53 below the June, 1920, business and that the business for July, 1-17 was $1,102 a day below that of July, 1920.

For the six months ended June 30 the company's earnings fell short by $183,000 of providing a 7 per cent return on $15,000,000.

The commission merely continued the order that now is in effect, giving the company a 5-cent fare, with a 2-cent charge for transfers.

### New Ohio Bus Law in Effect Aug. 15

Motor vehicles transporting passengers for hire between municipalities in Ohio will be subject to regulation as public utilities beginning Aug. 15, on which date the Graham bill passed by the recent Legislature, becomes effective.

Their classification as a public utility will require all such lines to file with the Ohio Public Utilities Commission, schedules of rates which may not be increased except after thirty days' notice by publication and makes them in all respects subject to the same control as is exercised by the commission over other public utilities.

Hundreds of such lines are in operation in the State, using both motor buses and touring cars, most of them operating in competition with interurban and steam railroads, but heretofore without any regulation whatsoever.

The utilities commission has prepared a notice of the new law, together with suggested forms for filing schedules, which are being mailed out to individuals and companies conducting motor transportation lines wherever the commission learns of such lines being in operation.

The law will not affect motor truck freight and express lines operating on highways, nor motor passenger lines operating within municipalities.

### Court Upholds Seattle's Right to Regulate Jitneys

The State Supreme Court at Olympia, Wash., on July 20 sustained the right of the city of Seattle to regulate jitney traffic on its streets. The decision was rendered in the rejection of an appeal of H. P. McGlothern against dismissal of an injunction action brought against the city to restrain enforcement of the regulation ordinance under which 187 applications for jitney operation had been refused.

In the King County Court, Judge Walter M. French had dismissed a temporary injunction granted the jitney operators pending final decision. The Supreme Court holds that this controversy questions the city's power to control its streets, a power of which there can be no doubt under a rule well established in this State and generally. The city is held to have had the authority and to have been engaged in proper exercise of it at the time injunction suit was brought.

The decision of the Supreme Court makes valid the jitney ordinance passed by the City Council in June a year ago. The decision, according to Corporation Counsel Walter F. Meier's office, gives the city the right to place the jitneys under restriction, to require all jitney drivers to obtain licenses and to keep the jitneys off certain streets served by the Seattle Municipal Railway.

At the time the ordinance was passed, the jitney drivers obtained a temporary restraining order that has been in effect for a year.

# Personal Mention

## Power Engineers Together

### Messrs. Murray and Flood Combine Forces as Consultants on Heavy Traction and Other Subjects

William S. Murray, formerly chairman of the Super-Power Survey, and Henry Flood, Jr., formerly engineer-secretary of the Super-Power Survey, have formed the firm of Murray & Flood, Grand Central Terminal, New York, for the purpose of carrying on a consulting engineering practice. The work to be undertaken will comprise general power engineering, public utility interconnections, power plant engineering, both steam and hydro-electric, heavy traction railroads and industrial electrification.

Mr. Murray was for many years the chief electrical engineer of the New York, New Haven & Hartford Railroad. His connection with the road began in April, 1905, when he secured the position of electrical engineer, later becoming consulting engineer with the road to undertake the electrification of the Now York division. The electrification of the railroad with the single-phase system was completed in 1915 at a cost of $25,000,000. During the latter part of the time when he was acting as consulting engineer he was a member of the firm of McHenry & Murray, which was formed in 1913.

MR. MURRAY A LEHIGH GRADUATE

In 1917 Mr. Murray became president of the Hoosatonic Power Company, which owned water power sites of that portion of the Hoosatonic River within the State of Connecticut. He was also chief engineer of the Connecticut Power Company, which purchased the company owning these power sites. This latter company has recently completed the hydro-electric station on the Hoosatonic known as the Stevenson plant, which is one installation of a chain of developments which, when completed, will make Connecticut's contribution to conservation the saving of 500,000 tons of coal annually.

Mr. Murray was graduated from Lehigh University in 1895 with the degree of electrical engineer. Upon graduation he went with the Westinghouse Electric & Manufacturing Company, and during the following seven years successively passed through its manufacturing, testing and construction departments. With the last-named department he was associated with the first high-tension plant installation in the State of Maine.

Mr. Flood likewise has had previous consulting engineering practice in New York City. His most recent work consists of an association with Dr. John Price Jackson in conducting the power survey for interconnecting the electric utilities companies of western Pennsylvania, eastern Ohio, and northern West Virginia, and in acting as engineer-secretary of the Super-Power Survey.

Mr. Flood received his technical education at Cornell University. He was for a number of years associated with the electric utility industry, starting with the Newburgh Light, Heat & Power Company as assistant to the manager of the electrical department. Later he was associated with the Grand Central Light & Power Company as power engineer and from there went to the Central Hudson Gas & Electric Company as chief engineer, where he remained for seven years. Following this he was mechanical engineer for the American Smelting & Refining Company. It was this company he left to take up work as a consulting engineer.

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## Mr. McKinley Attends Interparliamentary Union

William B. McKinley, Senator from Illinois and president of the Illinois Traction Company, Peoria, has sailed again on a foreign mission. He left New York on Aug. 4 on the *George Washington* for Stockholm to attend the nineteenth conference of the Interparliamentary union, composed of members of the national legislative bodies of more than twenty governments in Europe, Asia and America. The forthcoming meeting will be the first since 1914.

Mr. McKinley has long been a deep student of economic and political questions and has made himself an authority on matters involving foreign relations. This is the more unusual because all the time he has been deeply concerned with the management of his banking interests, to say nothing of the calls made on his time for advice and help in the administration of the Illinois Traction System, probably the most extensive combined city and interurban railway system and lighting property in the country. Several years ago, Mr. McKinley, accompanied by a party of friends went on a trip around the world, spending considerable time in the principal foreign cities.

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**Robert B. Rifenberick**, formerly consulting engineer of the Detroit (Mich.) United Railway, has been appointed valuation engineer of the United Railways & Electric Company, Baltimore, Md. Mr. Rifenberick was connected with the Detroit United Railway from 1909 until the early part of the present year. Before that he was consulting engineer of the Cleveland Electric Railway and previous to that he was engineer in charge of construction on the Cleveland & Eastern Railway. He was long in the services of the steam railroads. He was graduated from the Miami University Scientific Training School in 1885.

**H. H. Buckman**, master mechanic of the Interstate Public Service Company, Indianapolis, Ind., has tendered his resignation effective Sept. 1, 1921. After severing his present connection, he will represent the United Lead Company in the Middle West, with headquarters at Indianapolis. Mr. Buckman has been with the Interstate organization for seventeen years, and his energy and thorough knowledge of his department have materially assisted in bringing the traction system of the company to its present high state of efficiency. Mr. Buckman's successor has not yet been appointed.

**Captain George F. Daggett** has been appointed secretary to George McAneny, chairman of the Transit Commission. Captain Daggett became chief clerk of the old Public Service Commission soon after it was organized in 1907. Nine years later he was appointed assistant secretary. He joined the war forces in 1917, was commissioned as captain and attached to the Army Intelligence Department in Washington. After the armistice he returned to the commission as chief of the Transit Bureau. He resigned in 1920. The Transit Commission is seeking to bring back to the service men whose ability has been proved.

**Louis T. Klauder** recently resigned from the Philadelphia Rapid Transit Company as construction engineer to enter the consulting engineering field. Mr. Klauder was graduated from the Williamson School in 1901 and from the Drexel Institute in mechanical and electrical engineering in 1908. He entered the engineering department of the Pennsylvania Iron Works in 1901, later resigning to become associated with the Philadelphia Rapid Transit Company in 1905. With the latter company he occupied in turn positions of draftsman, chief draftsman, assistant engineer and construction engineer in charge of plant design and construction. From the last-named position he has just retired in order to devote his entire time to consulting work.

**C. A. Baxter** has been appointed superintendent of transportation of Chicago & Oak Park Elevated Railways, Chicago, to succeed H. G. Harding, who resigned to become general superintendent, Chicago & Interurban Traction Company. Mr. Baxter has been trainmaster of the Oak Park "L" since 1912. He began work in the electric railway field as a train clerk on the Metropolitan West Side Elevated Railroad, Chicago, in 1895. A year later he became a motorman on the same road, continuing until he was made trainmaster of the Oak Park line in 1912. His early experience in the railroad field began when he was fifteen years old as a telegraph operator and station agent on the Springfield-Sandusky (Ohio) branch of what is now the Big Four Railroad, and later on the Burlington Railroad, in Nebraska and Kansas.

J. G. HUNTOON

## Management Localized

### Greater Individual Responsibility to Cities Will Hereafter Devolve on Tri-City Officials

The Tri-City Railway, Davenport, Iowa, has undergone a sweeping reorganization of its personnel to the extent that it will divide the detailed management of the railway in Iowa and Illinois, localizing the interests in an endeavor to get into closer personal touch with the various communities. This is the first step in a general reorganization of the system and a general realignment of the present personnel.

J. G. Huntoon, general manager of the Tri-City Railway since 1908, and now a vice-president of the company, retired from the active capacity of manager on Aug. 1. T. C. Roderick, present assistant general manager, has become general manager of the Tri-City Railway of Illinois. R. J. Smith, formerly superintendent of overhead construction, has become general manager of the Tri-City Railway of Iowa, and Clark G. Anderson, assistant general manager of the interurban lines, has become general manager. E. L. Fischer, general manager of the Muscatine Lighting Company, becomes general manager of the Muscatine railway lines. These promotions and changes were referred to briefly in the ELECTRIC RAILWAY JOURNAL for July 23.

This reorganization means the localizing of lines in Illinois, Davenport, Muscatine and the interurban lines under existing heads, in order that greater efficiency may be obtained in the way of relieving the main office of much detail. Each line will be placed under a separate head and all books will be kept in the respective offices for that line.

T. C. RODERICK

Mr. Huntoon has desired for some time to relinquish his duties, but his resignation was refused by President B. J. Denman, because Mr. Huntoon's services were considered necessary to the successful working out of certain matters. The change that has now been brought about is merely the consummation of a long effort on the part of the general manager to be relieved of detail work, in order to be free to put into effect broad principles advanced by him for establishing closer personal touch with the three cities.

Mr. Huntoon is by no means severing all connection with the line, for he will remain as vice-president of the company. He is a railway operator who has come through all phases of the work to general manager. In recording Mr. Huntoon's life history, one Davenport newspaper says that thirty-three years ago he set out one morning looking for a job. A gang was at work laying track for the Davenport & Rock Island Railway, the pioneer horse-car line of that city. John Huntoon was hired as a water boy, and he later became timekeeper, then cashier, and in 1895 succeeded Henry Schnitzer as superintendent. In 1908 Mr. Huntoon stepped up another rung when he became general manager and vice-president of the Tri-City Railway, succeeding James F. Lardner, who retired. He has held that position continuously since.

R. J. SMITH

Mr. Roderick, the new general manager of the Rock Island and Moline line, is backed by twenty-five years' experience in traction operation. He went to the Tri-City in March, 1918, from Grand Rapids, Mich., where he was engineer of the Grand Rapids Railway for eleven years. Previous to that time he had been connected with the Citizens' Street Railway, Detroit, and with the Indianapolis Street Railway.

C. G. ANDERSON

R. J. Smith, who becomes the new general manager of the Davenport line, went to Davenport in 1911 as assistant construction engineer of the Clinton, Davenport & Muscatine Railway. At the completion of this interurban, Mr. Smith became engineer of way and structure for the Tri-City Railway and since the year 1918 he has acted in this capacity for all of the properties controlled by the United Light & Railway.

Mr. Anderson, the new general manager of the Clinton, Davenport & Muscatine Railway, had been assistant general of the property since 1914. For the four years prior to his connection with the railway he was the commissioner of public works of Moline, having been in the service of the city as city engineer from 1905 until 1910. Mr. Anderson was born in Moline, Ill., in 1873. While in the University of Illinois he specialized in civil engineering and was graduated wth the class of 1898. During the succeeding seven years until he became city engineer of Moline, he was in a general engineering practice in Peoria, Ill.

Mr. Fischer, the new general manager of the Muscatine division of the company, retains his position as general manager of the Muscatine Lighting Company, to which he was appointed in 1918. Mr. Fischer is a young man who has risen rapidly to

E. L. FISCHER

the top. His first position, involving some real responsibility, was with the Fort Dodge Gas & Electric Company as electrical superintendent. Although he took this position in the fall of 1917 he was promoted to general superintendent of the same company in the spring of 1918. In August, 1918, he resigned to become general manager of the Muscatine Lighting Company.

Mr. Fischer entered the Iowa State College in 1908 and was graduated with the degree of Bachelor of Science in Electrical Engineering with the class of 1912. His first railway connection was with the Fort Dodge, Des Moines & Southern Railroad, whose employ he entered in April, 1912, as general storekeeper. In the fall of that year, however, he severed his connection with the railway in order that he might take up experimental work at the Iowa State College for a few months. In November, 1912, he entered the employ of the Fort Dodge Gas & Electric Company as a meter man and in two years he was advanced to superintendent of electrical distribution. Mr. Fischer received the degree of electrical engineer from Iowa State College.

## Obituary

### George W. Edwards

George W. Edwards, president of the Brooklyn (N. Y.) Rapid Transit Employees' Benefit Association, died on July 30 following an operation. In many respects Mr. Edwards was a very unusual man. He had a positive genius for handling men and it was for this reason that he was appointed by the company in charge of its welfare activities at the inception of that work. "Pop" Edwards was the sobriquet applied to Mr. Edwards by the men on the B. R. T. This title was well chosen for Mr. Edwards was in many ways a father to the thousands on the system. At his office at the main club house of the company in East New York the men came to Mr. Edwards for succor and advice on all sorts of questions and they found in him a most sympathetic counselor. He had come up from the ranks himself and had never lost the common touch and the men knew that what George Edwards told them he told them from deep convictions of his own.

Mr. Edwards started is as a brakeman on the elevated lines in New York. He went to work for the elevated in Brooklyn as a train dispatcher when the first elevated railroad was opened there in 1885. Later he was made superintendent and then general superintendent of the Brooklyn elevated. In May, 1904, he was made secretary of the Employees' Benefit Association. Shortly afterward he was elected president of the association. When the pension department was organized in 1910 Mr. Edwards was made secretary and member of the board of pensions. In 1912 he was appointed welfare administrator of the entire property. Mr. Edwards was born in New York City sixty-six years ago.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Buy Coal Now!

### Letter From Secretary of Commerce Advises the Buying of Coal as Soon as Possible

The Secretary of Commerce made public on July 18 the text of a letter that he has addressed to all the public utility associations. The letter reads:

I would like to call the attention of your association to the bituminous coal outlook. There is every indication that there has been an undue slackness in the purchase of coal, which may accumulate to large demands in the autumn. I am convinced that, due to the general depression, the prices of bituminous coal at the mines are not too high at the present time. This, I think, is proved by the fact that numbers of operating coal companies are making no profit whatever. If there should be a recovery of business activities in the autumn, taken in conjunction with the large increase in percentage of disabled cars (from 5 per cent to 16 per cent during the past six months) and the inability of the railways to finance their maintenance, there are possibilities of development of a most serious situation as regards coal movement.

I cannot but feel that the Interstate Commerce Commission, in the face of warnings they have sent out in this connection would not be disposed to give any priority in such an event. It seems to me, therefore, to be obvious that the public utility companies, both in their own interests and in the protection of the public, should make early provision for stocks of coal sufficient to carry them over a critical period.

## Metal Market Unfavorable

The copper market situation is far from favorable. Prices are ¼ cent lower than when last quoted. Pressure to sell by outside interests is held responsible for the weaker prices, but even large producers have lowered their quotations to 12.75 cents for August shipment. With small producers copper is available at 12.50 cents delivered for August and 12.25 for prompt shipment. Consumers have not reacted to these lower prices, however; in fact, as selling interests become more anxious to unload buyers hold off all the more. It is stated that as low a price as 12.12½ cents per pound delivered has been made by second hands. Wire base has dropped ¼ cent to 14 to 14.50 cents.

The Copper Export Association on Aug. 15 called in for redemption $1,000,000 of its 8 per cent gold notes, series A, due Feb. 15, 1922. The securities to be redeemed represent about 10,000,000 lb. of copper.

The value of non-ferrous scrap metals recovered in 1920, according to the Geological Survey, amounted to $188,507,260, or $6,666,000 more than in 1919. Copper recovered in 1920, including that in alloys other than brass, had a value of $48,060,800, compared with $41,812,000 the preceding year. In the same period brass scrap remelted increased from $75,944,100 in 1919 to $77,454,000 last year.

The lead market is quiet with prices steady. Tin has dropped again and is cheap at its present low price of 26 cents, but buying interest has not reacted as yet. Zinc is a shade firmer, and though sales are still quiet, producers are not pressing to sell.

## Insulator Market Active

### Demand for High-Tension Insulators Is Falling Off, But Previous Orders Keep Manufacturers Busy

Production of high-tension insulators is still at full capacity throughout the industry, but as deliveries are being made faster than orders are received, it is a question just how long this will hold true. One of the large producers, for instance, has enough business on hand to keep going full time for two months, though it is admitted there is not a whole lot in sight after that time. Deliveries have been steadily improving and now range from about four to six weeks on suspension types and four to eight weeks on pin-type insulators, depending upon the voltage. No stock has yet been accumulated on the high-tension types, but on low and medium voltages there has been some accumulation. Very few orders are being received from electric railways, but there are quite a number from central power stations. These latter orders, however, are small in size.

## Lamp Production Still Low

Production of lamps has been showing a falling off during the last few months. From reports on factory operation it would seem that production now is on a basis of about 65 to 70 per cent of capacity, and when it comes time for the two weeks summer shutdown of those factories which expect to close it is probable this term will be extended a week or so.

Although factory lamp stocks are pretty large, there are a few signs that point to a possible reduction. There has been a noticeable pick-up in activity among the textile mills in New England, although the metal industries there and in general are still dull. The longest days of the year are a month and more behind us and the earlier evenings are already noticeable. From some quarters it is reported that lamp distributors have been cutting down on their lamp orders to a greater degree than their lamp sales have dropped off, indicating a reduction of their stocks. If this is so, their orders, it seems, should soon begin to increase in size. Of course, the lighting load on central stations shows a decrease throughout the summer months this year as well as in the past, and in addition the industrial depression has kept many lamps dark.

## Rolling Stock

**Elmira Water, Light & Railroad Company, Elmira, N. Y.**, has received the eight safety cars which were ordered some time ago from the Osgood-Bradley Car Company.

**The Columbus (Ga.) Railroad** has ordered four new cars for delivery about Oct. 1. These cars are of a similar type to those already in service.

**Pacific Electric Railway Company, Los Angeles, Cal.**, has recently purchased some additional Birney safety cars for extending its service. This company now has sixty-nine Birney safety cars in operation on its local lines.

**The New Orleans Railway & Light Company, New Orleans, La.**, has ordered 400 Nichols-Lintern mechanical sander equipments. These will be installed on cars already in service in order to comply with the laws recently passed by the Legislature of the State of Louisiana.

**Detroit (Mich.) Municipal Railway**, mentioned in the July 23 and other issues as purchasing 100 safety cars on July 12, has issued the following data on these cars.

| | |
|---|---|
| Number of cars ordered | 100 |
| Date of order | July 12, 1921 |
| Delivery | Approximately three months |
| Builder | 25 McGuire-Cummings Mfg. Cc<br>50 St. Louis Car Company<br>25 Osgood-Bradley Car Company |
| Type of Car | Safety |
| Seating capacity | 32 |
| Weight, total | 16,000 lb. |
| Truck wheelbase | 8 ft. |
| Interior trim | Cherry |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | Westinghouse DH16 |
| Axles | 4 in. |
| Bumpers | 6 in Channel section |
| Car signal system | Faraday |
| Car trimmings | Statuary Bronze |
| Control | K 63 |
| Curtain fixtures | Curtain Supply Company |
| Curtain material | O'Bannon 076 |
| Designation signs | Keystone |
| Fare boxes | Johnson |
| Fenders or wheelguards | H.B. |
| Gears and pinions | Westinghouse Helical |
| Heater Equipment | Cutler-Hammer |
| Headlights | Golden Glow No. 96 |
| Lightning arresters | Westinghouse |
| Motors | Westinghouse 508 |
| Paint | Sherwin-Williams, Old Dutch Enamel |
| Registers | International, R7 Air operated |
| Sanders | Osgood-Bradley traps |
| Sash fixtures | Howard & Edwards |
| Seats | Manufacturers' Standard |
| Seating material | Wood Slats |
| Step treads | Feralun |
| Trolley catchers or retrievers | Ohio Brass Company |
| Trolley base | Ohio Brass Company |
| Trolley wheels or shoes | Ideal 4½ in. |
| Trucks | Manufacturers' Standard |
| Ventilators | Manufacturers' Standard |
| Wheels | Steel, 26 in. |
| Special devices, etc. | Nichols-Lintern duplex tail lights |
| Center lighting | Electric Service Supplies Company Fixtures and opal shade |

## Track and Roadway

**Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis Ind.**, recently prevented the City Council from awarding a contract for the improvement of Seminary Street as had been contemplated owing to the surrender of its franchise under which it operates through Greencastle, Ind. The street will be re-advertised and the contract probably awarded in August. The traction company's line runs through the city over Seminary Street.

**Indiana Service Corporation, Fort Wayne, Ind.**, will not build the much-needed new line to the thickly populated northwest section of Fort Wayne owing to the fact that remonstrators have been successful in killing the proposed paving of the street over which the line was to run. It was the plan of the traction company to install the new line when the street was improved, and in a letter to the board of public works recently the company explained that it will be impossible to lay the proposed double track unless the street is widened. Now an effort is being made by the councilman from this particular section to get through a petition for the widening of the street. The proposed route is down Franklin Avenue from the end of the Huffman car line to Third Street and thence west.

**Detroit (Mich.) United Railway** has notified the Pontiac City Planning Commission that rebuilding of trolley lines in that city, removing the third track from Saginaw Street and double tracking the northwestern division in that city is very doubtful. The expense would total about $300,000. General Manager Burdick announces that adequate repairs are being considered.

**Seattle (Wash.) Municipal Street Railway**, has had the approval of the Council in its extension and betterment plan. Recently by a vote of five to four, the Council adopted a report adding the extension of the Beacon Hill car line at a cost of $100,000 to the bill providing for the issuance of $1,330,000 of railway utility bonds.

## Power Houses, Shops and Buildings

**Southern Pacific Company, Oakland, Cal.**, has prepared specifications for a new station and for rearrangement of tracks after learning that private plans for building a combination office building and station at Franklin and Fourteenth Streets could not be financed. The plans call for a building on Thirteenth Street midway in the block and for the removal of the small buildings now there.

**Portland Railway, Light & Power Company, Portland, Ore.**, has recently placed in operation in its East Lincoln Street station, the largest turbo-electric generator in this territory. The generator is a General Electric Curtis turbo type. The generator has a rated capacity of 12,500 kw. Wood waste will be used as fuel, but fuel oil can be used if necessary.

**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.**, has bought the plant site of the Pelton Steel Company, Kinnickianic Avenue, Milwaukee, for the extension of its carhouse and shops.

## Trade Notes

**The Shire Electrical Products Company, Marquette Building, Detroit**, has developed a "Startometer" for measuring storage battery output under load.

**The Whiting Corporation, Harvey, Ill.**, has developed its "short-turn overhead trolley system" for material handling employing short-radius curves, switches, cutouts, etc.

**The Automatic Reclosing Circuit Breaker Company, Columbus, Ohio**, announces the opening of an office at 110 Hale Street, Charleston, W. Va., with Donald J. Baker as manager.

**The Griscom-Russell Company, 90 West Street, New York City**, has recently placed on the market its low-pressure expansion joint known as the G-R type "C."

**The Permutit's Water Softening Patent Upheld.**—In a suit in equity by Permutit Company, 440 Fourth Avenue, New York City, against the Harvey Laundry Company, a user of the apparatus in question, and the Refinite Company, inventor and manufacturer thereof, to enjoin infringements of letters patent No. 1,195,923, Judge Hazel on June 15, in the United States District Court, Western District of New York, handed down a decision in favor of the Permutit Company.

**The Wheel Truing Brake Shoe Company, Detroit, Mich.**, recently celebrated its twenty-third anniversary as a company. It has also enlarged its factory space by the erection of a new plant into which the business has been moved. This change has at least quadrupled facilities for manufacturing Wheel Truing Brake Shoes, it is stated. Business is not as large in volume as in the first half of last year, but though orders are smaller individually, they are reported to be greater in number. Most customers specify immediate shipments, it is said, indicating that reserve stocks are low. Foreign business on this particular product has been light, though shipments have recently been made to Melbourne, Australia and Honolulu, T. H.

**The Buffalo Forge Company, Buffalo, N. Y.**, is now pushing construction to remodel the entire fan shop. This shop, when completed, will be one of the largest fan shops in the United States, covering 64,235 sq.ft. including 23,873 sq.ft. of assembling galleries. While this extension is in progress production continues without interruption, and when it is completed all fan construction will be accomplished with a minimum handling. The material racks are served by an electric railway truck with automatic lift platform.

**American Di-Electrics, Ltd.**, 71 West Broadway, New York City, announces that the address of E. A. Thornwell, its Atlanta (Ga.) distributer, has been changed from Atlanta Trust Building to Candler Building.

**Charles S. Crowell**, Philadelphia manager of the Underfeed Stoker Company of America, left the latter's employ on July 1. Mr. Crowell has no definite plans for the future, it is stated but after a short vacation will remain actively in the combustion field.

**The International Western Electric Company, 195 Broadway, New York City**, announces that E. C. Richardson, who has been manager of the Western Electric Compania Italiana at Rome and Milan since 1910, and who also saw foreign trade service at Antwerp has been transferred to Peking, China, as general manager of the China Electric Company—the Far Eastern subsidiary of the American electrical concern. He succeeds C. H. Minor, who has supervised the operations of the China Electric Company ever since it started business early in 1918. Mr. Minor is returning to the European organization of the International company and will make his headquarters at London.

**Cie J. G. Brill, Paris, France**, which was organized in 1908 for the distribution of the products of the J. G. Brill Company, Philadelphia, in Spain, France and Algeria, has expanded its territory to include Belgium, Italy, Switzerland and Luxembourg. The facilities of the company were also recently enlarged by the addition of new forge, machine and assembly shops and store rooms at Gallardon, 40 miles from Paris. C. B. Dubbleman, 19 Rue du Parnasse, Brussels, who has heretofore been the J. G. Brill Company's agent in Belgium and Holland, will continue as its representative in Holland, but will represent Cie J. G. Brill in Belgium. Giovanni Chechetti, Piaza Sicilia 1, Milan, will continue to handle the Brill products in Italy, but as the representative of Cie J. G. Brill.

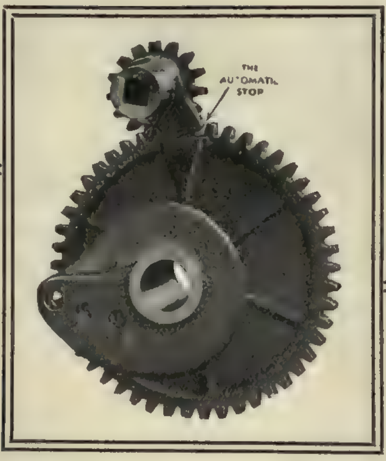
**The Nichols-Lintern Company, Cleveland, Ohio**, manufacturer of car ventilators, sanders indicating signals, etc., reports several recent sizable orders for mechanical sanders, among which are fifty-two equipments for the Pennsylvania & Ohio Electric Company; 400 equipments for the New Orleans Railway & Light Company (both of these orders including hoppers and all accessories), and 150 equipments for the Massachusetts Northeastern Street Railway. Orders have also been received from three other traction companies and two steel companies recently. Since Jan. 1, 1921, it is stated, a total of 550 N-L indicating signals have been specified and ordered. The Railway & Power Engineering Corporation, Ltd. Toronto, Canada, which manufactures and sells Nichols-Lintern products in Canadian territory, has recently received orders for 200 equipments of N-L indicating signals from the Toronto Transportation Commission and for 2,000 N-L ventilators from the Canadian Car & Foundry Company.

## New Advertising Literature

**"Phono-Electric" Trolley Wire.**—Bulletin No. 15, the June 1921 issue of "Phono-Electric," published irregularly by the Bridgeport Brass Company, Bridgeport, Conn., is printed in French. It is being distributed among the electric railway trade in France.

**The R. Thomas & Sons Company, East Liverpool, Ohio**, manufacturer of porcelain insulators, etc., has just issued a new catalog on "Standard Electrical Porcelain" which includes a number of interesting features. Dimensions of the various products are given in both inches and millimeters, export as well as domestic shipping weights are included and a code word for each item is listed.

**J. G. Brill Company, Philadelphia, Pa.**, has issued Volume 11, No. 12, of the Brill magazine, dated June, 1921. This is the second copy of this publication to be issued since May, 1918, the first having appeared in June, 1920. The general adoption of the safety car has standardized equipment to such an extent that there is less interesting material available for publication, and hence the magazine at present appears only occasionally. The current issue describes cars recently shipped to Brazil, South Africa and Cuba, as well as gasoline-driven motor omnibuses and trailers made by the company.



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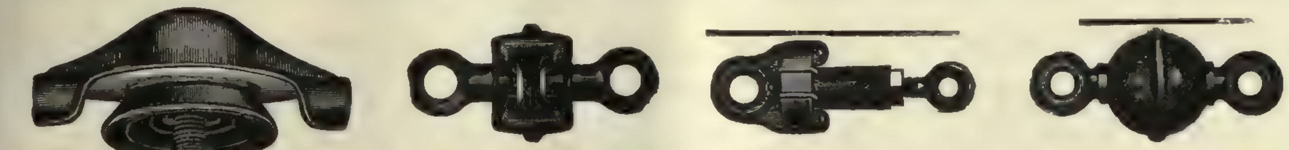


## You Can Minimize Overhead Repair Work

and successfully cut maintenance costs if you turn to

## The Macallen Line

of strain insulators, hangers, splicing ears, crossings, and other overhead material.

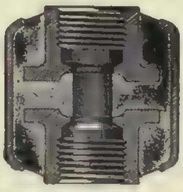
They are "specialty" products, designed and built to make "Macallen" the standard on American railways.

It will pay you to write for information and prices.

## The Macallen Insulating Joint

Adopted by principal air brake manufacturers as part of their standard equipment. Also insulates steam pipes, etc. Shell is seamless drawn steel, nipples are machined from steel rod, and insulating material is Macallen Vulcanite Compound, not affected by heat or oil—practically indestructible.

*May We Send Our Catalog?*



TRADE MACALLEN MARK.

## The Macallen Company

Macallen and Foundry Sts., Boston

TRADE MACALLEN MARK.

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**THE COAL & IRON NATIONAL BANK**
**of the City of New York**

Capital $1,500,000
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Offers to dealers every facility of a New York Clearing House Bank.

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*Engineers*
Unit Power Plants insure low power costs
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# American Rail Bonds

CROWN
UNITED STATES
TWIN TERMINAL
SOLDERED
TRIPLEX

*Send for new*
*Rail Bond book*

**American Steel & Wire Company**
CHICAGO
NEW YORK

# COMING SOON—The opportunity of the year to stimulate sales in the Electric Railway Field

Selling effort should be continuous. It must be continuous in times like these. But every so often an event or a combination of circumstances makes a supreme selling effort especially important.

In the electric railway field, such an opportunity occurs in October and this year will reward selling effort more liberally than for many years past.

## The Event Which Provides the Opportunity

The American Electric Railway Association's Annual Conventions which this year will be held at Atlantic City during the week of October 3, is the great annual gathering of electric railway officials. It is an event which vitally interests every wide-awake man in the industry. The subjects discussed and the decisions reached are high-spots in electric railway history.

This year's convention will be particularly important because the field is embarking on the biggest rehabilitation program in its history. For the first time since the war electric railway finances are showing a decided upward trend. Track reconstruction, extensions, new rolling stock and improvements on the line, in the shops, substations and power plants will multiply rapidly from now on. These facts will form a background for discussions that will interest every electric railway man and should interest every progressive manufacturer.

This year's convention should be the most important that has been held since the war. In connection with this event—

## ELECTRIC RAILWAY JOURNAL

*"The Bible of the Industry"*

has every year for over a generation carried to the entire field in its advertising pages an exhibit of the electric railway equipment, apparatus and supplies produced by the most progressive and reliable manufacturers.

It has thus helped these manufacturers carry a selling message to the entire industry in a manner that has left a lastingly favorable impression.

*This year Electric Railway Journal will outdo past service records.*

## The Annual Convention Issue

### Dated September 24

will carry the only big exhibit of electric railway equipment and materials this year. There will be no exhibit at Atlantic City. The field will look for it in the *Electric Railway Journal*—and will find it there.

***The Exhibit Section*** will be arranged in the advertising pages in carefully classified groups. Section covers printed in two colors will mark each of the various classes of products.

The Sections already arranged for are

1.—Track Roadway and Line Material
2.—Shop and Power Plant Equipment
3.—Car and Truck Equipment
4.—Rolling Stock

Others will be added as required.

***The Buyers' Guide*** to be published in the Convention Issue will permit exhibitors (advertisers) to list under practically any desired heading a wide variety of products. There is no charge for these headings.

***The Buyers' Guide Booklet***
The Buyers' Guide described above will be reprinted in the form of a booklet for electric railway officials and one of these will be sent to every reader of *Electric Railway Journal's* Convention Issue—over 7,000—the men who buy for 99% of the world's electric railway car-mileage. There is no charge for this service to Convention Issue advertisers.

The CONVENTION ISSUE of *Electric Railway Journal* will reach every electric railway in the United States, Canada and Mexico and practically every other electric railway in the world.

The time to reserve space and plan copy is here—NOW.

***Circulation***

# Over 7,000 Copies

No advance in advertising rates. Regular rates apply.

**ELECTRIC RAILWAY JOURNAL, Tenth Ave. at 36th St., NEW YORK**

# What You Really Get

## SPECIFICATIONS
— for —
BUTT-TREATING CEDAR POLES
P & H Guaranteed Penetration Process

### HEIGHT OF TREATMENT

The butts of all poles shall be treated to the height as set forth in the table below.

### PENETRATION RESULT

The sapwood of each and every pole shall be impregnated with the preservative to a depth of one-half inch in every portion of the pole in that area between the plane designated as the height of treatment as set forth in the table below, to a plane one and one-half feet below the standard ground line, unless the sapwood be less than one-half inch in thickness, in which case the impregnation will be to the full depth of the sapwood throughout this area.

### PENETRATION TEST

The result shall be determined by making frequent tests with an increment borer, removing thereby a plug taken from this area at a point one foot below the standard ground line. The hole from which this plug is removed will then be sealed with Creosote, after which a creosoted plug will be tightly driven in.

### PRESERVATIVE

The preservative shall be a pure coal-tar distillate obtained entirely from coal gas or coke-oven tar and must not contain any admixture of any other tar oil or residue obtained from petroleum or any other source, including coal-gas or coke-oven tar and must conform to the standard specification of the American Wood Preservers Association, and the American Railway Engineers Association for Creosote Oil, and the National Electric Light Association's "A" Specifications covering coal-tar creosote.

| Length of Poles | Standard Ground Line | Height of Treatment |
|---|---|---|
| 16 feet | 4 feet | 5 feet |
| 18 " | 4 " | 5 " |
| 20 " | 4 " | 5½ " |
| 22 " | 4½ " | 6 " |
| 25 " | 5 " | 6 " |
| 30 " | 5½ " | 6½ " |
| 35 " | 6 " | 7 " |
| 40 " | [illegible] " | 7 " |
| 45 " | 6½ " | 7½ " |
| 50 " | 7 " | 8 " |
| 55 " | 7½ " | 8½ " |
| 60 " | 8 " | 9 " |
| 65 " | 8 " | 9½ " |
| 70 " | 8 " | 10 " |
| 75 " | 8 " | 10 " |
| 80 " | 8 " | 10 " |

Butt-Treated
BY
PAGE & HILL Co.
1921
GUARANTEED
One-Half Inch
PENETRATION

*This disc countersunk on the butt-end of every pole Butt-Treated by the P & H Guaranteed Penetration Process is your assurance of one-half inch penetration.*

## *You Really Get This In Place of Uncertain Results*

THE specifications for the P & H Guaranteed Penetration Process are not a specified method of Butt-Treatment but are specifications that produce a guaranteed one-half inch penetration result.

The result specifications printed here are not only rigidly carried out, but are also securely backed up by a written guarantee on poles butt-treated by this process. Page & Hill Co. guarantees without qualifications to refund the entire butt-treating price on every pole that does not show the prescribed ½ inch uniform penetration.

This is a radical departure from old methods. Every pole-buyer knows what this means in enabling him to keep down his pole maintenance costs.

Insist on getting the genuine, the P & H Guaranteed Penetration Process. Do not be satisfied with any substitute process.

*Full Particulars on Request.*

**PAGE & HILL CO.**
**Minneapolis, Minn.**

BRANCH OFFICES:

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717 Bryant Bldg., KANSAS CITY, MO.
19 So. LaSalle, CHICAGO, ILL.
1111 Carter Bldg., HOUSTON, TEXAS
311 Sumpter Bldg., DALLAS, TEXAS
1416 Starks Bldg., LOUISVILLE, KY.

*Originators of the P & H Guaranteed Penetration Process. Producers, manufacturers, and foremost in the Butt-Treatment of Cedar Poles.*

# "STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

S BRAND

*"The 'Standard' Brand on your material is an assurance of eventual economy."*

S BRAND

## STANDARD STEEL WORKS CO.

**GENERAL OFFICES**

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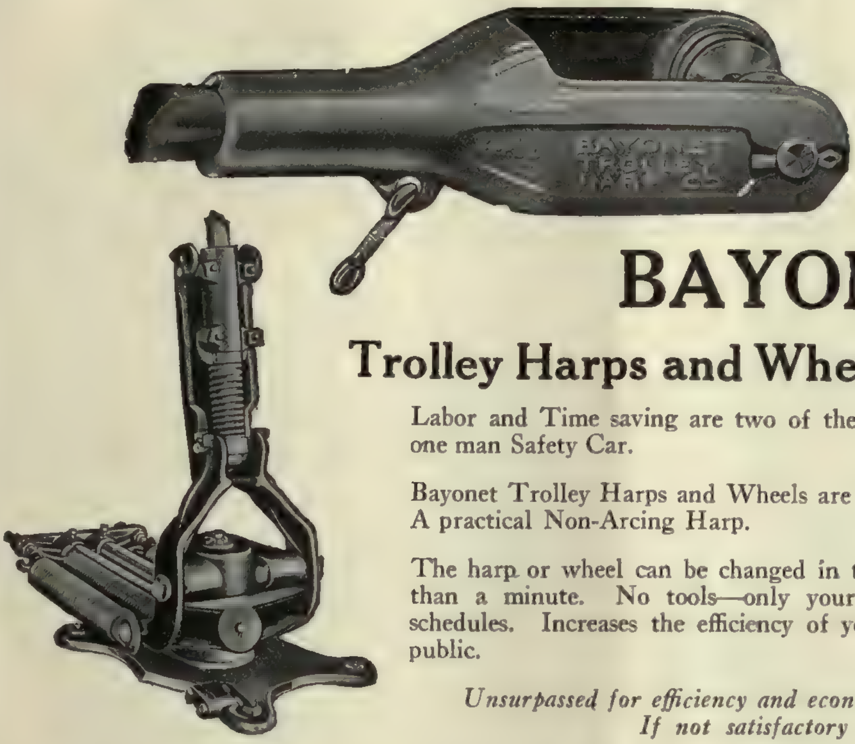

# BAYONET

## Trolley Harps and Wheels for Safety Cars

Labor and Time saving are two of the advantages obtained with a one man Safety Car.

Bayonet Trolley Harps and Wheels are time savers and labor savers. A practical Non-Arcing Harp.

The harp or wheel can be changed in ten seconds, or a pole in less than a minute. No tools—only your hands. No delays to car schedules. Increases the efficiency of your service to the travelling public.

*Unsurpassed for efficiency and economy. 60-day trial offer.*
*If not satisfactory return.*

**BAYONET TROLLEY HARP CO., Springfield, Ohio, U. S. A.**

## Bates One-Piece Steel Poles with Ornamental Lighting

This installation illustrates one of the possibilities of combining Artistic Bates Poles with ornamental lighting units.

The excessive number of poles required where trolley conductors and lighting units are installed on separate poles is not only decidedly inartistic, but is also a needless waste of good material. Of course, it is necessary that an artistic steel pole be used for such a combination of purposes.

The series lighting conductor is run from pole top to pole top eliminating the use of expensive, troublesome underground cable.

**The use of Bates Permanent Steel Poles with ornamental lights represents maximum economy and the utmost in art.**

**Bates Expanded Steel Truss Co.**

208 South La Salle Street
CHICAGO, ILLINOIS

# READING COMPROMISE or STEP JOINT

**Don't *compromise* on your choice of a compromise joint.**

A COMPROMISE joint in your track may be a potential source of trouble. Protect yourself by using Reading Compromise or Step Joint.

They are made of the highest quality heat-treated cast steel, and are designed to resist the wear due to pounding and working of the rail ends under heavy traffic.

This cast steel joint is ready to fit in place as soon as cast—no punching or working of the cold metal after casting.

Made for all Sections of Girder and Tee Rail.

***Write for particulars.***

**AMERICAN CHAIN CO., Inc.**

**Reading Specialties Division**

***General Sales Offices:***
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***District Sales Offices:***
**Chicago Pittsburgh Boston Philadelphia**
**Portland, Ore. San Francisco**

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# AXLES, GEARS and WHEELS

These are some of the most important parts of street railway, elevated railway and interurban equipment and it is imperative that they stand up under the severe service conditions of every-day use. The failure of any one of these parts, especially *during* rush hours and peak load, means not only a tie-up and delay but also financial loss and causes bad feeling on the part of your passengers.

We make AXLES, ROLLED and FORGED GEAR BLANKS, and ROLLED STEEL WHEELS to meet every requirement of electric railway service. Our products are of the highest grade and backed up by many years of successful experience in dealing with this important branch of transportation.

*Specify Midvale and Cambria products.*

**MIDVALE STEEL AND ORDNANCE COMPANY**

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DISTRICT SALES OFFICES:
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SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 165 BROADWAY, NEW YORK, U.S.A.

Now Is the Time
To Check Up On the Line

Anderson

Line Material is just what you need for replacements.

Anderson Steady Strain, Feeder Insulators and Crossovers wear longer and give better service.

*Overhaul your Overhead. Do it now.*
*Prices are right.*

**Albert & J. M. Anderson Mfg. Co.**
(Established 1877)
**289-293 A Street, Boston, Mass., U. S. A.**

BRANCHES:
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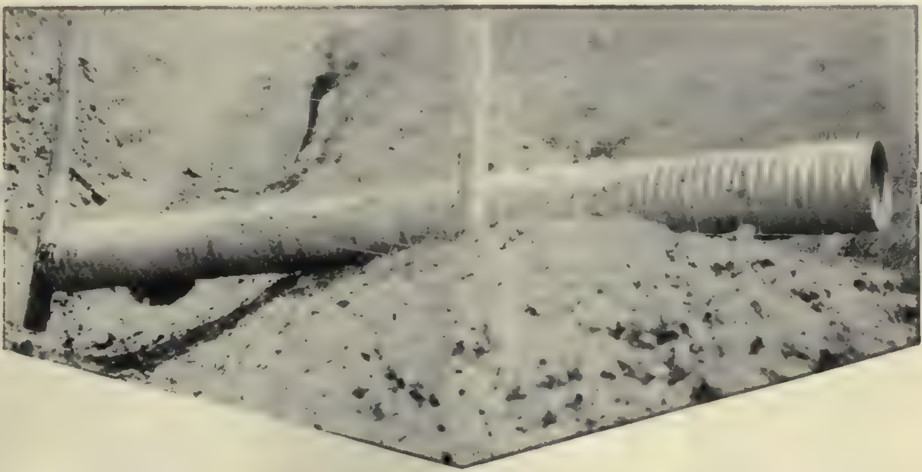


**IMPERIAL** Riveted SPC TONCAN METAL Corrugated **CULVERTS**

—removed after 11 years—hardly affected

In 1908 a 15-inch IMPERIAL Riveted Corrugated Culvert was installed under the White Bear Lake and Phalen road in Ramsey County, Minn.

When removed in 1919 to make way for a larger culvert, it was found to be in perfectly-serviceable condition. The above (unretouched) view was taken of this culvert right after its removal. You will notice that eleven years of continuous use had practically no effect on it.

Its fine condition indicates that it would have lasted for many more years.

Everywhere IMPERIAL Corrugated Culverts are giving unusually long service. The reason? They are made of anti-corrosive Toncan Metal—it endures! IMPERIALS are furnished in all the standard diameters. Prompt shipment can be made. We also make "ACME" (Nestable) Corrugated Culverts of Toncan Metal. Write for delivered prices.

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.

# International Fare Registers

## Help to Secure Full Collections

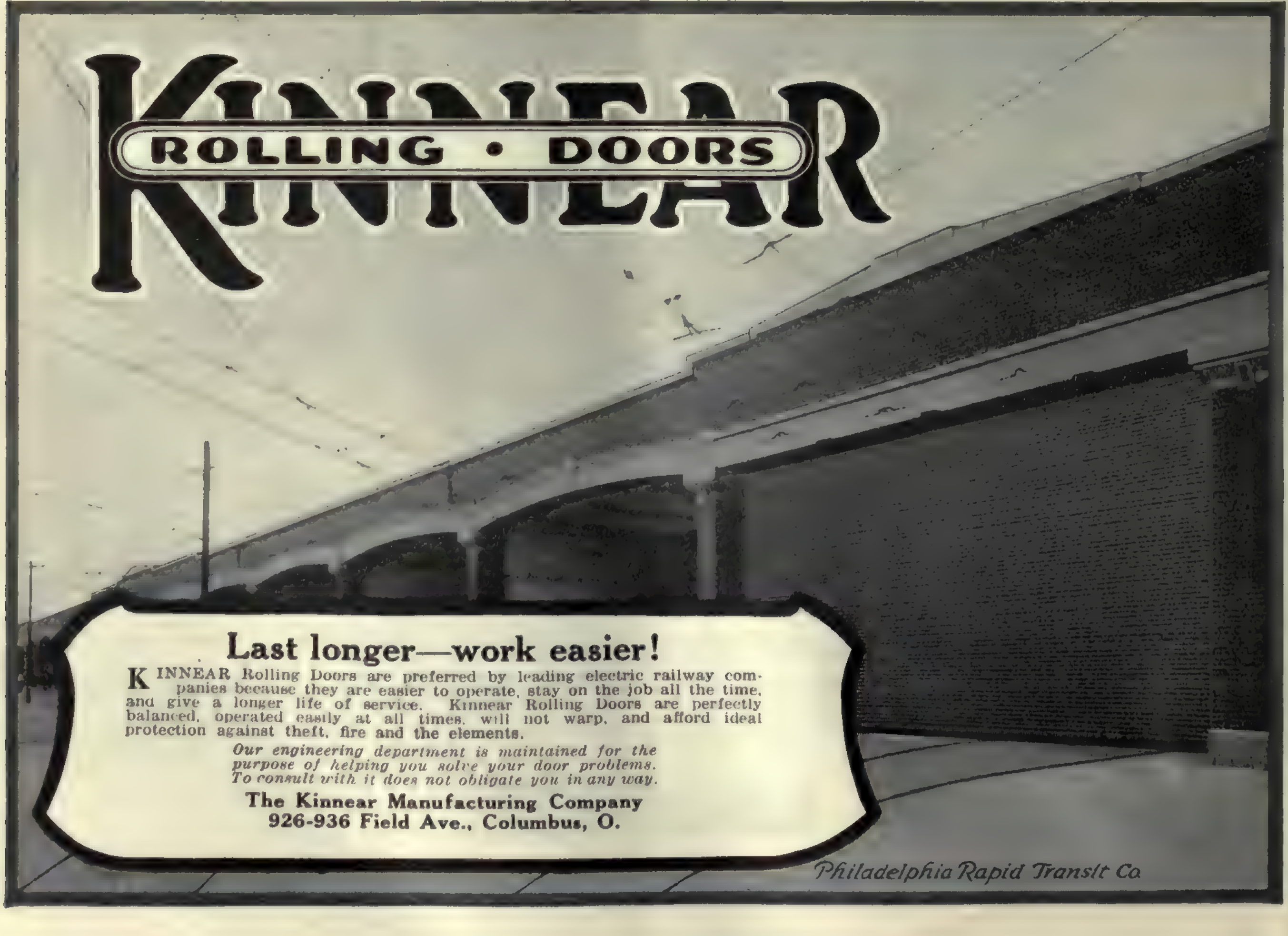
Safeguarding the collection system by a simple and accurate fare registration has become standard practice on most city systems. The final visible and audible registration of overhead registers makes the fare collection system completely effective.

International Registers provide this registration in accurate dependable form. They are built to fit the need of modern street railway service, and to give reliable registration over a long period of useful life.

*We invite correspondence regarding your fare collection and registration problems.*

**Manufacturers of Fare Registers and Railway Supplies and General Selling Agents for HEEREN ENAMEL BADGES**

**The International Register Company**
**15 South Throop Street, Chicago, Ill**



**KINNEAR**
**ROLLING • DOORS**

**Last longer—work easier!**

KINNEAR Rolling Doors are preferred by leading electric railway companies because they are easier to operate, stay on the job all the time, and give a longer life of service. Kinnear Rolling Doors are perfectly balanced, operated easily at all times, will not warp, and afford ideal protection against theft, fire and the elements.

*Our engineering department is maintained for the purpose of helping you solve your door problems. To consult with it does not obligate you in any way.*

**The Kinnear Manufacturing Company**
**926-936 Field Ave., Columbus, O.**

Philadelphia Rapid Transit Co.

# You Can Bend Rails Quickly and Economically With a Watson-Stillman Hydraulic Rail Bender

Hydraulic Portable Rail Bender

The portable rail bender shown herewith is designed for use on the road. It is equipped with interchangeable formed bending blocks, and will make any bend without buckling. The hinged yoke permits the rails to be put in sidewise. It can also be used for other heavy bending.

**We build many other handy tools for the railway shop. Such as: Crank Pin Presses, Wheel Presses, Forcing Presses, Forging Presses, Jacks, Pit Jacks, Punches, Shears, Pumps, Accumulators, etc.**

***Write for Catalogs.***

**The Watson-Stillman Co., 46 Church St., New York**

**Chicago: McCormick Building** **Philadelphia: Widener Building**

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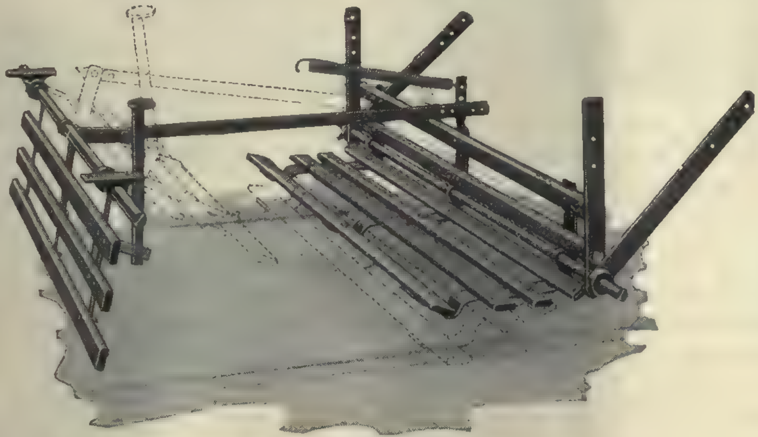
# Two Big Essentials for Efficient Service



## Spring Life Guard For All City Cars

The use of spring steel makes it lighter, stronger and practically unbreakable.

The new operating device is most efficient. It cannot rattle down yet it drops very quickly when anything hits the gate. It weighs but 123 pounds.

We will ship, on approval, one car equipment to any street railway or car builder in the U. S. or Canada.

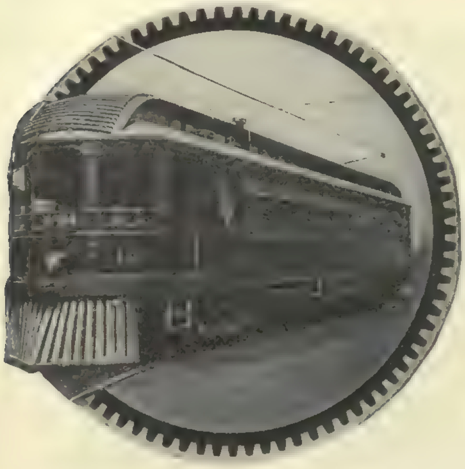
## THE RELIABLE No. 7

**Hand or Air Operated**

***Dependable Always.***

*Send for complete information and literature.*

**The Root Spring Scraper Co.**
**Kalamazoo, Michigan**



All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

**BP- The name of a superior make of gears for electric railway service.**

BP gears excel any other make of gears in the following characteristics:

—Hardness to resist wear.

—Strength to withstand shocks, strain and vibration.

—Smooth operation because of their accurately cut teeth.

—Long life.

BP gears are the product of the R. D. Nuttall Company and are manufactured in all types and sizes up to nine feet in diameter.

For reliability, long life, and smooth operation, specify Nuttall BP gears.

**R.D.NUTTALL COMPANY**
**PITTSBURGH AGMA PENNSYLVANIA**

**Nuttall**

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# Carnegie Wrought Steel Wheels

*for Strength*

Carnegie Steel Company has had long experience in the manufacture of rails, cross ties, rail joints, etc., for track maintenance—also in the manufacture of shapes, plates, bars, wheels and axles for rolling stock.

The shock and strain of modern railway operation demand a wheel of unusual strength. Carnegie Steel Wheels, hydraulically forged and rolled, will fulfill the requirements of the most exacting service.

Under actual test the flange of a Carnegie Wheel has withstood a lateral thrust of 525,000 pounds—a sufficient indication that wrought steel wheels will stand up under unusual strain.

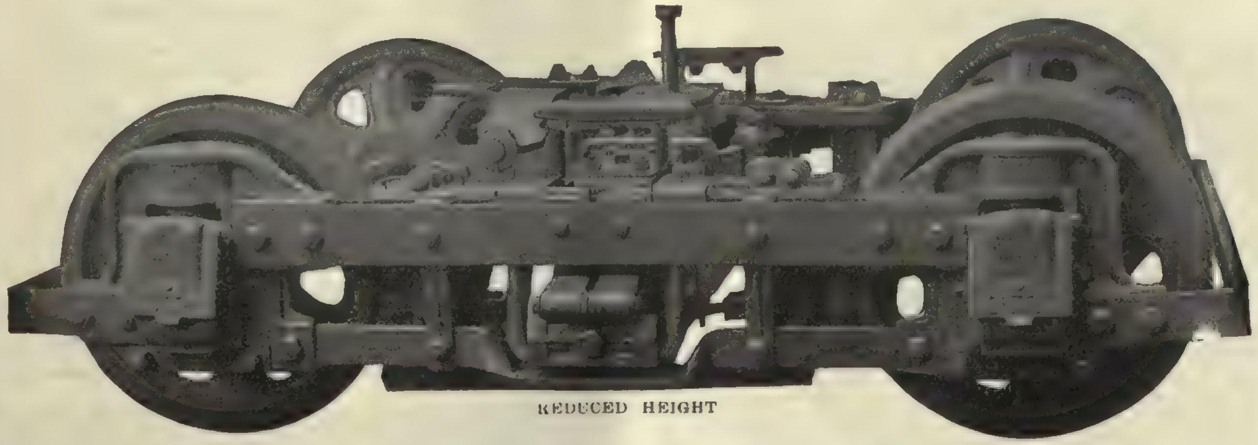
Of solid steel—one piece, uniform in structure and free from internal blow-holes, the entire strength of Carnegie Steel Wheels is available to resist all operating stresses.

**For strength, specify Carnegie Steel Wheels**

**Carnegie Steel Company**
General Offices: Carnegie Building, Pittsburgh, Pa.

R. H.

TAYLOR REDUCED HEIGHT TRUCK



REDUCED HEIGHT

TAYLOR R. H. TRUCK

Mounted on 26-in. Wheels with Springs Over Journal Boxes.
Designed to Mount Centre and End Entrance Cars Low Down.

SWING MOTION AND FULL ELLIPTIC SPRINGS

Wheel Base 5 ft. 2 in. For Car Bodies weighing 16,000 to 22,000 lb. Motors Inside Hung.

EASY RIDING

Journals 3¾ x 7 M. C. B. Type. Height from Rail to Body Bolster, 22¾ in. Brakes Inside Hung.

TAYLOR ELECTRIC TRUCK CO., TROY, N.Y.

SPECIFICATIONS ON REQUEST — Established 1892 — SEND FOR PORTFOLIO

This Is QUALITY RATTAN from the QUALITY SHOP

Examine it closely. It is not a hand picked specimen but a section taken from a photograph of a car seat.

All our rattan is imported. It is delivered to you in rolls ready to tack on. It is the best that is possible to obtain. Ask for samples and prices.

IMMEDIATE DELIVERIES

St. Louis Car Company
St. Louis, Mo.

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used throughout for power lighting, signalling and interlocking
KERITE INSULATED WIRE & CABLE COMPANY
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No. 2

AIMCo REG. U.S. PAT. OFF.

Electric Railway Automatic Signals

**for Accessibility and Reliability**

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"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.

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Philadelphia, New York Chicago

**Transmission Line and Special Crossing Structures, Catenary Bridges**

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RAILROAD TIES, SWITCH TIES and CROSSING PLANK

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*Write for List*

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DUNCAN LUMBER COMPANY, Portland, Oregon

**Shop-Built Thermit-Welded** THERMIT WELDING **Frogs and Crossings**

Long lived, but cost only fraction of cost of solid manganese frogs. Unlike latter, they can be welded in place and built up, and they require no bonds. Easily and cheaply constructed in railroad shops by welding together spare pieces of rails.

*Send for Pamphlet 3932*

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**120 Broadway, New York**
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205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of
**Special Work for Street Railways**
**Frogs, Crossings, Switches and Mates**
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**Kerwin Portable Crossovers**
**Balkwill Articulated Cast Manganese Crossings**

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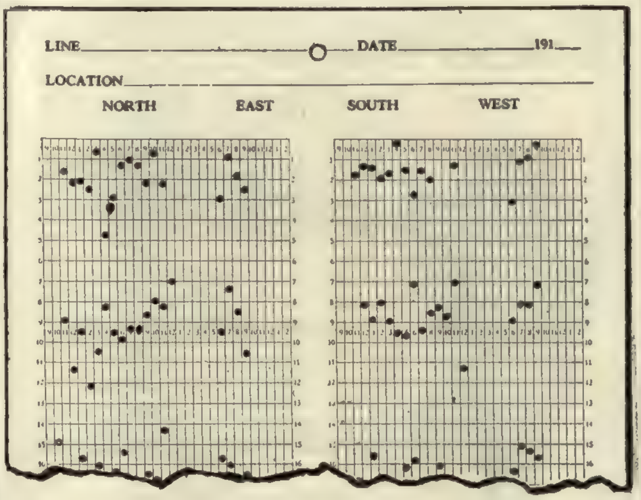


**Are You Maintaining Schedules?**

Increase your returns by improving the *service* on which they depend. The *cars themselves* mark their time on the daily chart of the Nachod Automatic Headway Recorder—a record of operation for the superintendent, easy to read and file for reference. The chart shows how late or early the car is according to schedule. The Recorder points out irregularities and "slack" in the schedule. An instrument with many uses—an efficient tool for the careful manager. Write for Recorder Manual. Nachod Signal Co., Inc., Louisville, Ky., Manufacturers of Block Signals and Highway Crossing Signals.

**Nachod Headway Recorders**

**RAWLS TRACKMOWER**

An attachment for motor, hand or push car, operated by ordinary workmen.

**IN USE ON 29 ROADS**

We specialize in trackmower equipment only.

**RAWLS MACHINE AND MANUFACTURING CO.**
**1412 N. Halsted St., CHICAGO, ILL.**
Representatives: S. E. Rawls, Elwyn B. Orr, Russell King
Cable Address: Rawlsmachy. Codes, A B C 5th Ed. and Private

**High-Grade Track Work**

SWITCHES—MATES—FROGS—CROSSINGS
COMPLETE LAYOUTS
IMPROVED ANTI-KICK BIG-HEEL SWITCHES
HARD CENTER AND MANGANESE CONSTRUCTION

**New York Switch & Crossing Co.**
**Hoboken, N. J.**

**RAMAPO**

Automatic Safety and Automatic Return Switch Stands for Passing Sidings. Tee Rail Special Work for Interurban Lines and Private Rights of Way **Manganese Construction a Specialty.**

**Ramapo Iron Works**
**HILLBURN, NEW YORK**
Plants at Hillburn, N.Y. and Niagara Falls, N.Y. New York Office, 30 Church Street

**Nelsonville Filler and Stretcher Brick for T Rails**

Makes permanent, light, level pavement with a minimum of paving repairs.

**The Nelsonville Brick Co.**
**Columbus, Ohio**

**Peirce Forged Steel Pins with Drawn Separable Thimbles**

Your best insurance against insulator breakage

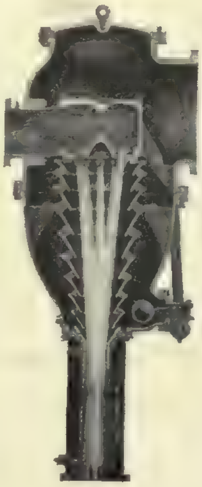
**Hubbard & Company**
PITTSBURGH, PA.

**FLOOD CITY**

***Rail Bonds and Trolley Line Specialties***

**Flood City Mfg. Co., Johnstown, Pa.**

KOERTING MULTI-JET CONDENSERS



have the following features:

NO AIR PUMP required

Low Headroom

High Vacuum

Economic Operation

Utmost Simplicity of Construction

*Catalog 5-AB*

SCHUTTE KOERTING

1155 Thompson Street
Philadelphia, Pa.

SPECIAL TRACKWORK
Of the well-known WHARTON Superior Designs *and* Constructions

STEEL CASTINGS CONVERTER AND ELECTRIC
FORGINGS DROP, HAMMER AND PRESS
GAS CYLINDERS SEAMLESS STEEL

WM. WHARTON JR. & CO., Inc., Easton, Pa.
(Subsidiary of Taylor-Wharton Iron & Steel Co., High Bridge, N. J.)

ORIGINATORS OF
MANGANESE STEEL IN TRACKWORK

ERICO
ECONOMICAL
EFFICIENT
RAIL BONDS

THE ELECTRIC RAILWAY IMPROVEMENT CO.
CLEVELAND, OHIO

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES
BOSTON, 49 Federal Street
PHILADELPHIA, North American Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
TUCSON, ARIZ., 21 So. Stone Avenue
FORT WORTH, TEX., Flatiron Building
HONOLULU, H. T., Castle & Cooke Building

THE BABCOCK & WILCOX COMPANY STEAM

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES
DETROIT, Ford Building
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, Southern Pacific Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 705-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, PORTO RICO, Royal Bank Building

WE-FU-GO AND SCAIFE
WATER PURIFICATION SYSTEMS SOFTENING & FILTRATION FOR BOILER FEED AND ALL INDUSTRIAL USES
WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

THE CUTTER ELECTRICAL AND MANUFACTURING CO. CIRCUIT I-T-E BREAKERS PHILADELPHIA

I. T. E. Circuit Breakers

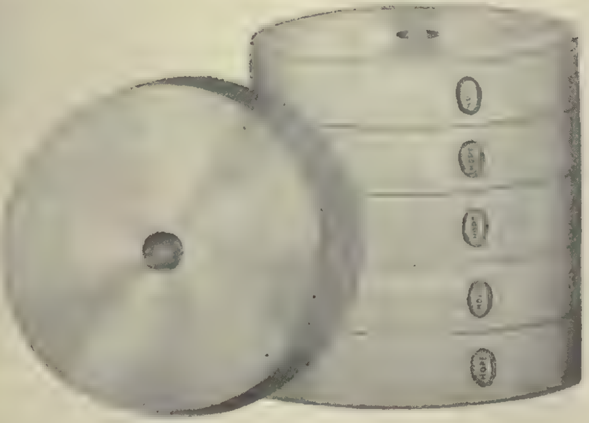
for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

FOSTER SUPERHEATERS

A necessity for turbine protection, engine cylinder economy and utilization of superheat for all its benefits

Power Specialty Company Boston Chicago Philadelphia San Francisco Pittsburgh London, Eng. 111 Broadway, New York

# HOPE TAPES



For results — Tapes, Webbings, Sleevings, of uniform and standard quality for electric purposes, that is, Hope Webbing Company service.

***Send for samples and prices***

**HOPE WEBBING CO.**
**Providence, R. I.**
**New York** **Chicago**

WHENEVER you see WILLIAMS' trade mark, W, on a wrench, remember that tool has been made as well as nearly half a century's experience can make it. Over 40 *standard* patterns, in 1000 sizes.

*Wrench Book on request.*

**J. H. Williams & Co.**
*"The Wrench People"*
BROOKLYN
143 Richards St.
BUFFALO
143 Vulcan St.
CHICAGO
1143 W. 120th St.

# FORD TRIBLOC

**"What'll I do if it slips?"**
**"It won't slip!"**

There are no "life nets" in a factory. Hoists are built with a liberal margin of safety. In FORD TRIBLOCS this is 3½ to 1.

FORD TRIBLOCS have won the confidence of thousands of men who use them daily. They know "It won't slip!"

The LOOP HAND CHAIN GUIDE is a patented malleable iron loop. It parallels the lower half of the hand chain wheel, providing a strong, rigid flange, which guides the chain at any angle, and prevents gagging or overriding.

Men work the FORD TRIBLOC from all sides with speed, precision, and *confidence!*

All sizes and capacities—write us for particulars.

**FORD CHAIN BLOCK CO.**
**2nd and Diamond Sts., Phila., Pa.**
Overseas Representative:
**Allied Machinery Co.**
**of America**
**51 Chambers St., New York**

2182-D

# TRACTIONS

**POWER**
**GEARS**
**OF**
**ROLLING STOCK**
**PROTECTED WITH**

BORNE SCRYMSER COMPANY
METAL LIFE
FOR
- CABLES -
GEARS
PINIONS.
80 SOUTH ST. NEW YORK

**ASK US FOR**
**FACTS**

**Are your handling costs eating into profits?**

GIVE your machine operators *labor-saving* helpers—the kind that work for practically nothing per week.

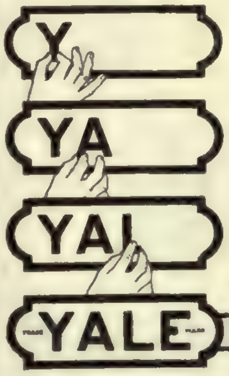
The Yale Spur-Geared Block and I-Beam Trolley System, pictured above, is used for lifting heavy pipe and swinging it into position on the threading and cutting-off machines.

One man does it all without a helper, easily and quickly. This is the Yale Way.

Other units of the Yale Hoisting and Conveying System include Screw-Geared and Differential Chain Blocks, Electric Hoists, Electric Industrial Trucks, Tractors, and Trailers. Write for further information about the Yale Way.

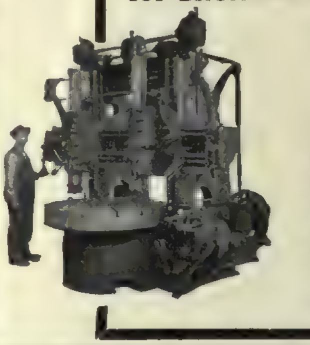
**Yale Made Is Yale Marked**

**The Yale & Towne Mfg. Co.**
*Makers of Yale Products:*
*Locks, Hoists and Electric Industrial Trucks.*
**Stamford, Conn., U. S. A.**



**Hoisting and Conveying Systems**

**NILES-BEMENT-POND CO.**
**111 BROADWAY, NEW YORK**



**MACHINE TOOLS**

**FOR ELECTRIC RAILWAYS**

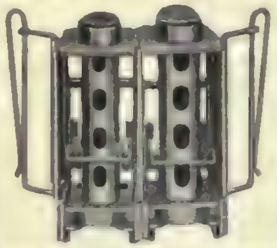
**Axle Lathes**
**Wheel Presses**
**Car Wheel Lathes**
**Boring Mills**
**Lathes**
**Hammers**
**Cranes**
**General Machine Tools**

Use only Awebco Tape on your Armatures

Field Coils have better protection when wound with "AWEBCO Tape." Send for samples.

**ANCHOR WEBBING COMPANY**
**300 Brook Street, Pawtucket, Rhode Island**

**JOHNSON Universal Changer**



**Adjustable**

The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

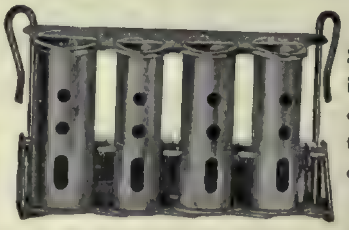
**Flexible**

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

**JOHNSON FARE BOX COMPANY**
**Ravenswood, Chicago, Ill.**

**HIGH SPEED MONEY CHANGERS**

**The new 1921 model —without rivets— ready for delivery**



**Supplied in one or four tube combinations**

Essential wherever the rapid and accurate handling of change is required. Now included in the standard equipment of largest Traction Companies because conductors demand them. Prices and literature sent on request.

**J. L. GALEF, 75 Chambers St., New York City**
**Exclusive Manufacturers' Selling Agent**

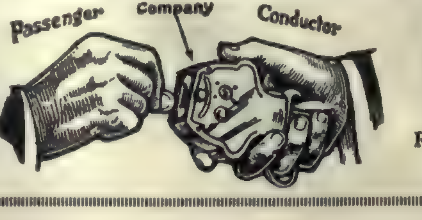
***SPECIFY***
**THE TERRY TURBINE**
**For Driving Your Auxiliaries**
**TERRY STEAM TURBINE CO.**
**Hartford, Conn**

Let us tell you of our especially designed fare box for the

**ONE MAN CAR**

**The Cleveland Fare Box Company**
**CLEVELAND, OHIO**
**Canadian Cleveland Fare Box Co., Ltd., Preston, Ontario**

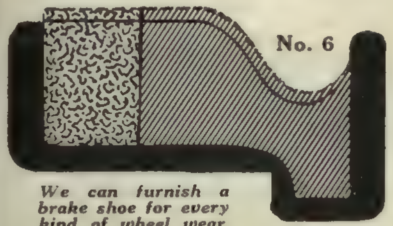
**BUCKEYE JACKS**
high-grade R. R. Track and Car Jacks
**The Buckeye Jack Mfg. Co.**
**Alliance, Ohio**



**Direct Automatic Registration By the Passengers**

**Rooke Automatic Register Co.**
**Providence, R. I.**

**Sharp Flanges Are Costly**



*We can furnish a brake shoe for every kind of wheel wear.*

They often cause derailments. You can eliminate them and guarantee safe service by equipping your cars with wheel truing brake shoes.

When only outer part of the tread needs grinding, ask for this type of brake shoe.

**Wheel Truing Brake Shoe Co.**
**Detroit, Michigan**
U. S. Trade Mark—Wheel Truing Brake Shoe

**The Kalamazoo Trolley Wheels**

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

**THE STAR BRASS WORKS**
**KALAMAZOO, MICH., U. S. A.**

Use them in your terminals—
PEREY TURNSTILES
or PASSIMETERS

*Faster than the ticket seller*

Perey Manufacturing Co., Inc.
30 Church Street, New York City

ELECTRIC HEATER EQUIPMENTS

THERMOSTAT CONTROL EQUIPMENTS

Address All Communications to
BUSH TERMINAL
(220 36th St.)
Brooklyn, N. Y.

*Literature on Request*

**Heating and Ventilating**

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

**The Cooper Heater Company**
Carlisle, Pa.

**Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.**

**CONSOLIDATED CAR HEATING CO.**
**ALBANY, NEW YORK, CHICAGO**

**The Wheel Whose Cost Is Based on Performance**

WE can afford to guarantee satisfactory service or refund your money because Hensley Wheels are made of "Resisto" bronze.

In figuring costs count in the labor-saving feature of Hensley self-lubricating trolley wheels—then specify them.

*Write for catalogue.*

**Hensley Trolley & Mfg. Co.**
Detroit, Mich.

HENSLEY

B. A. Hegeman, Jr., President
Charles C. Castle, First Vice President W. C. Lincoln, Mgr. Sales & Engineering
Harold A. Hegeman, Vice Pres. and Treas. Fred C. J. Dell, Secretary

**National Railway Appliance Co.**
**50 East 42nd St., New York City**

Hegeman-Castle Corporation
343 So. Dearborn St., Chicago, Ill.

National Railway Appliance Co.
Munsey Bldg., Washington, D. C.

National Railway Appliance Co.
Little Bldg., Boston, Mass.

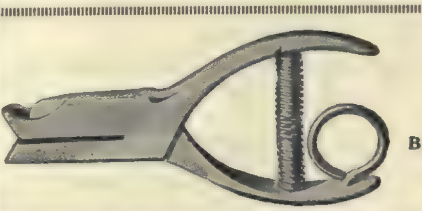
**RAILWAY SUPPLIES**

Tool Steel Gears and Pinions
Anderson Slack Adjusters
Genesco Paint Oils
Dunham Hopper Door Device
Feasible Drop Brake Staffs
Flaxlinum Insulation
Anglo-American Varnishes, Paints, Enamels, Surfacers, Shop Cleaner
Johnson Fare Boxes
Drew Line Material and Railway Specialties
Perry Side Bearings
Hartman Centering Center Plates
Economy Power Saving Meter
H & W Electric Heaters
Garland Ventilators
Pitt Sanders
National Safety Car Equipment Co's One-Man Safety Cars

**BAKELITE-DILECTO**

The fields of usefulness for Bakelite-Dilecto are many and varied because of its superior merit over materials heretofore available in sheets, tubes or rods. The exceptional qualities of Bakelite-Dilecto are satisfying electric railways all over the country. Investigate.

**The Continental Fibre Co., Newark, Delaware**
Branch Offices:
CHICAGO, 332 S. Michigan Ave. NEW YORK, 233 Broadway
Pittsburgh Office, 301 Fifth Ave. San Francisco Office, 525 Market St.
Los Angeles Office, 411 S. Main St.
Canadian Office, 1710 Royal Bank Bldg.



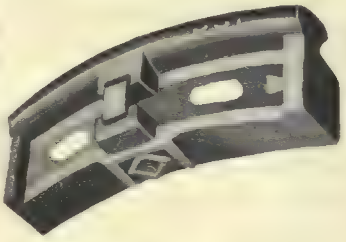
Economical in the Long Run

**BONNEY-VEHSLAGE TOOL CO.**
Newark, N. J.

Brake Shoes
A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type

Standard Patterns for SAFETY CAR



D-67 for Narrow Treads
D-87 for Wide Treads

**American Brake Shoe and Foundry Co.**
30 Church Street, New York
332 So. Michigan Ave., Chicago Chattanooga, Tenn.

Continuous service over long periods counts most

Simplicity of design enables us to produce the lightest Trolley Catchers and Retrievers with the fewest and most rugged parts.

**C. I. EARLL, York, Pa.**

They are uniform in quality

*They talk for themselves*

**W. J. Jeandron**
227 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

HASKELITE

*The Plywood made with waterproof glue*

An Engineering Material
used by car builders

*for*

Roofs Side Panels
Headlining Ceilings
Bottoms and Backs of Seats

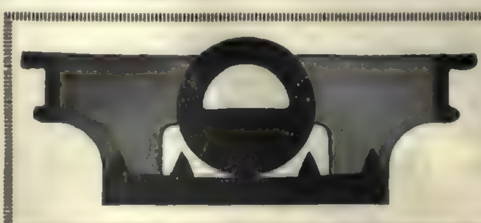
*Write for Samples and Prices*

HASKELITE MANUFACTURING CORP.
133 W. Washington St., Chicago, Illinois

See the Crank of the
CREAGHEAD DESTINATION SIGN

By means of it, conductor or motorman can change sign without leaving platform. All that has to be done is to turn the crank. Better investigate.

CREAGHEAD ENGINEERING CO., CINCINNATI, O.



STUCKI SIDE BEARINGS

A. STUCKI CO.
Oliver Bldg.
Pittsburgh, Pa.

Van Dorn
Car-Air-Electric Couplers
for Rapid-Transit Service

**Van Dorn No. 1450 Tight-Lock Car-and-Air Coupler**

Present-day maximum coupling efficiency is obtained with Van Dorn Coupler equipment.

The No. 1450 Tight-Lock Car-Air-Electric Coupler effects simultaneously, a safe, unyielding coupling of cars, air lines and electric circuits, making possible rapid make-up of trains, under little headway, to care for peak loads.

This type of Coupler is the result of many years of practical experience, together with constant experimental work, and will meet the most exacting requirements of modern rapid-transit service.

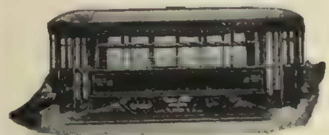
The positive tight-locking and "take-up" devices of the coupler head, the unlocking eccentric, and the "tell-tale" safety devices are among the many distinctive and up-to-the-minute features of Van Dorn Car-Air-Electric Couplers.

*A full description is yours for the asking!*

**Van Dorn Coupler Company**
**2325 So. Paulina St., Chicago, Ill.**

DAVIS
Steel Wheel

**American Steel Foundries**
**NEW YORK CHICAGO ST. LOUIS**



PERLEY A. THOMAS
CAR WORKS

**Manufacturer of Cars**
**and Car Materials**

SASHES, DOORS
INTERIOR FINISH
VESTIBULES AND FRAMING

**Cars of all types from one-man to large interurban**

HIGH POINT, N. C.

CURTAINS, VENTILATORS
SASH AND DOOR TRIMMINGS
DOOR AND STEP MECHANISM

**THE DIFFERENTIAL**
**STEEL CAR CO.**

**H. Fort Flowers, Pres. & Gen. Mgr.**
**FINDLAY, OHIO**

**A Single Segment or a Complete Commutator**

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. **CAMERON** quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

**Cameron Electrical Mfg. Co., Ansonia, Connecticut**

FORT PITT SPRING AND MANUFACTURING CO.
PITTSBURGH, PA.
Manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
RAILWAY SERVICE

**RAILWAY UTILITY COMPANY**

*Sole Manufacturers*
**"HONEYCOMB" AND "ROUND JET" VENTILATORS**
**for Monitor and Arch Roof Cars, and all classes of buildings:**
**also ELECTRIC THERMOMETER CONTROL**
**of Car Temperatures.**

**141-151 WEST 22D ST.** *Write for* **1328 Broadway**
**Chicago, Ill.** *Catalogue* **New York, N. Y.**

ELECTRIC RAILWAY JOURNAL

# Think "SEARCHLIGHT" First

## ADVERTISING RATES

**POSITIONS VACANT**—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

**POSITIONS WANTED**—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

**ADD 5 WORDS** for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

**DISCOUNT OF 10%** if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

**ADS IN DISPLAY TYPE**—Space is sold by the inch (30 in. to a page), the price depending upon total space used within a year, some space to be used each issue.

**RATE PER INCH** for ads in display space:

| | |
|---|---|
| 1 to 3 in., $4.50 an in. | 15 to 29 in., $3.90 an in. |
| 4 to 7 in., $4.30 an in. | 30 to 49 in., $3.80 an in. |
| 8 to 14 in., $4.10 an in. | 50 to 99 in., $3.70 an in. |

**POSITIONS VACANT** # EMPLOYMENT **POSITIONS WANTED**

## POSITIONS VACANT

WANTED; experienced inspector and supervisor for a street railway in middle western city of 40,000. $150. P-926, Elec. Ry. Jour. Old Colony Bldg., Chicago.

## POSITIONS WANTED

AUDITOR, 17 years with large railway properties open for position city or interurban lines. W-925, Elec. Ry. Jour., Leader News Bldg., Cleveland, O.

POSITION wanted in any one or a combination of the following allied power or railway activities: Purchasing agent, electrical superintendent, superintendent of construction, superintendent of distribution and operation, superintendent of rolling stock, superintendent of equipment, district superintendent. Technical graduate, eleven years' experience. Now enjoy excellent relations on engineering staff of large railway equipment manufacturer. Personal reasons for leaving. Available upon customary notice. PW-924, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

SUPERINTENDENT of transportation desires a change. Nearly 18 years' experience on large city and interurban properties with a proven record as a competent transportation official; successful in dealing with public and labor. Personal reasons for desiring a change and relations with present employers are pleasant and agreeable. Fully competent to take over any property and operate same in an economical and efficient manner. Best of references as to character and ability. PW-922, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

## BOOKS & PERIODICALS

**Magazines Wanted**

Back numbers of Electric Railway Journal wanted from 1910 to date. The H. W. Wilson Co., 964 University Ave., New York, N. Y.

FOR SALE

**Contractors' Hoisting Engine**

Double Drum, two cylinders 5¼ in. x 7 in. Fine running order. Price $600.

JOHNSON BROS.
Brocton, N. Y.

**You can get**

**A Production Checker**

**at little cost**

Here is an opportunity to get a *Productograph* to keep count and make curve chart record on one to twenty producing machines. From these records you know exactly the production you are actually getting from your machines. No guessing. It is in first class condition and various spare parts are included.

**Bargain price for quick sale.**

W. A. Hefner, care of McGraw-Hill Co., 10th Ave. at 36th St., New York City

FOR SALE

1—22x42 480 H.P. Bates Corliss Engine direct connected to 325 K.W., 550 Volt D.C., 100 R.P.M. Westinghouse Generator with Switchboard panel.

***Location Mattoon, Ill.***

**CENTRAL ILLINOIS PUBLIC SERVICE COMPANY**
***D. R. Truax Purchasing & Stores Agent***
Springfield, Illinois.

**For 20 Years**

we have been
Buying and Selling

**Second-Hand Cars**

Trucks and Motors

At Your Service

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa

# *The Searchlight Advertising in This Paper*

is read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

## THE BEST PROOF

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable *demand* for such machinery or services, by its readers, the market place which these advertisements represent could not exist for any length of time.

Are *you* using the Searchlight Section?

**20%** **20%**

# *NEW*
# REPAIR PARTS

---

G-E—67—58—57—52—1000

## 20% Off Current Prices

---

G-E 1200-800, W-12A

## 20% Over Junk Value

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GOING FAST

ARE YOU GETTING YOURS?

Rebuilt G-E 67 Motors
Rewound Armatures and Fields for Above Motors
Malleable—Gear Cases—Sheet Steel
K, K-2, K-10, K-11, K-12, K-14, K-6, Controllers and Repair Parts
AA-1 Air Compressors and Repair Parts
Various Truck Repair Parts
*Send Us Your Inquiries*

RECLAMATION DEPARTMENT

**20%** **20%**

**EASTERN MASS. ST. RY. CO.**
1 Beacon Street, Boston, Mass.

---

12—G. E. 74A Second Hand Motors.
1—61-70 lb. New Roller Rail Bender.
2—G. E. 80 Second Hand Motors.
2—K-28-E Second Hand Controllers.

**Chicago & Interurban Traction Co.**
E. E. Kretschmer, Purchasing Agent,
1347 Edison Building, Chicago.

---

OFFER FOR IMMEDIATE SHIPMENT

### 500-KW. MOTOR GENERATOR SET

1—500 kw. Westinghouse 550 volt, 833 amp., 514 r.p.m. compound wound dynamo direct connected to—

1—720 hp. Westinghouse 3 phase, 60 cycle, 2300 volt, synchronous motor. Outfit self contained, and complete with starting equipment for A.C. and D.C. ends.

**ARCHER & BALDWIN, INC.**
Tel. 4337-8 Rector
114-118 Liberty St.

---

## "Opportunity" Advertising:

Think *"SEARCHLIGHT"* First!

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
- Collier, Inc., Barron G.

**Anchors, Guy**
- Crouse-Hinds Co.
- Electric Service Supplies Co.
- Ohio Brass Co.
- Westinghouse Elec. & M. Co.

**Automobile and Buses**
- Brill Co., The J. G.

**Axle Straighteners**
- Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Cambria Steel Co.
- Carnegie Steel Co.
- Midvale Steel & Ordnance Co.
- St. Louis Car Co.
- Standard Steel Works Co.
- Taylor Electric Truck Co.
- Westinghouse Elec. & M. Co.

**Babbitt Metal**
- More-Jones B. & M. Co.

**Babbitting Devices**
- Columbia M. W. & M. I. Co.

**Badges and Buttons**
- Electric Service Supplies Co.
- International Register Co., The

**Bankers & Brokers**
- Coal & Iron National Bank

**Batteries, Dry**
- Nichols-Lintern Co.

**Bearings and Bearing Metals**
- Bemis Car Truck Co.
- Columbia M. W & M. I. Co.
- General Electric Co
- More-Jones Brass & Metal Co.
- St. Louis Car Co.
- Taylor Electric Truck Co.
- Westinghouse Elec. & M. Co.

**Bearings, Center and Roller Side**
- Stucki Co., A.

**Bells and Gongs**
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.
- St. Louis Car Co.

**Benders, Rail**
- American Chain Co., Inc.
- Niles-Bement-Pond Co.
- Watson-Stillman Co.
- Zelnicker, Walter A., Supply Co Inc.

**Boilers**
- Babcock & Wilcox Co.

**Boiler Tubes**
- National Tube Co.

**Bond Testers**
- American Steel & Wire Co.
- Rail Welding & Bonding Co.

**Bonding Apparatus**
- American Steel & Wire Co.
- Electric Railway Improvement Co.
- Electric Service Supplies Co.
- Ohio Brass Co.
- Rail Welding & Bonding Co.

**Bonds, Rail**
- American Steel & Wire Co.
- Copper Clad Steel Co.
- Electric Railway Improvement Co.
- Electric Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- Rail Welding & Bonding Co.
- Westinghouse Elec. & M. Co.

**Boring Tools, Car Wheel**
- Niles-Bement-Pond Co.

**Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)**
- Bates Expanded Steel Truss Co.
- Creaghead Eng. Co.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- Hubbard & Co.
- Ohio Brass Co.

**Brake Adjusters**
- National Railway Appliance Co.
- Westinghouse Traction Brake Co

**Brake Shoes**
- Amer. Brake Shoe & Fdry. Co.
- Barbour-Stockwell Co.
- Bemis Car Truck Co.
- Brill Co. The J. G.
- Columbia M. W. & M. I. Co.
- St. Louis Car Co.
- Taylor Electric Truck Co.
- Wheel Truing Brake Shoe Co.

**Brakes, Brake Systems and Brake Parts**
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Columbia M. W. & M. I. Co.
- General Electric Co.
- National Brake Co.
- Safety Car Devices Co.
- St. Louis Car Co.
- Taylor Electric Truck Co.
- Westinghouse Traction Brake Co.

**Brooms, Track, Steel and Rattan**
- American Rattan & Reed Mfg. Co.

**Brushes, Carbon**
- General Electric Co.
- Jeandron, W. J.
- Westinghouse Elec. & M. Co.

**Brush Holders**
- Anderson Mfg. Co., A. & J. M.
- Columbia M. W. & M. I. Co.

**Buses, Motor**
- Trackless Transportation Co.

**Bushings, Case Hardened & Manganese**
- Bemis Car Truck Co.
- Brill Co., J. G.

**Bushings, Graphite & Wooden**
- Bound Brook Oilless Bearing Co.

**Cables. (See Wires and Cables)**

**Carbon Brushes. (See Brushes, Carbon)**

**Car Panel Safety Switches**
- Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
- Differential Steel Car Co., Inc.

**Cars, Passenger, Freight, Express, etc.**
- American Car Co.
- Brill Co., The J. G.
- Cambria Steel Co.
- Kuhlman Car Co., G. C.
- Midvale Steel & Ordnance Co.
- McGuire-Cummings Mfg. Co.
- National Railway Appliance Co.
- St. Louis Car Co.
- Thomas, Perley A.
- Wason Mfg. Co.

**Cars, Second Hand**
- Electric Equipment Co

**Car, Self-Propelled**
- General Electric Co.

**Castings, Brass, Composition or Copper**
- Anderson Mfg. Co., A. & J. M.
- Columbia M W & M I Co
- More-Jones Brass & Metal Co.

**Castings, Funnel**
- Wharton, Jr & Co., Inc., Wm.

**Castings, Gray Iron and Steel**
- American Steel Foundries
- Bemis Car Truck Co
- Columbia M W. & M. I. Co.
- St. Louis Car Co.
- Standard Steel Works Co.
- Wharton, Jr. & Co., Inc., Wm.

**Castings, Malleable and Brass**
- Amer. Brake Shoe & Fdry. Co.
- Bemis Car Truck Co.
- Columbia M. W & M. I. Co.
- St. Louis Car Co.

**Catchers and Retrievers. Trolley**
- Earll, C. I.
- Electric Service Supplies Co.
- Ohio Brass Co.
- Wood Co., Chas. N.

**Ceiling Car**
- Pantasote Co.

**Change Carriers**
- Galef, J. L.

**Circuit Breakers**
- Condit Elec'l Mfg. Co.
- Cutter Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
- Anderson Mfg. Co., A. & J. M.
- Electric Railway Equipment Co.
- Electric Service Supplies Co.
- General Electric Co.
- Hubbard & Co
- Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms)**
- Brill Co., The J. G.
- Ohio Brass Co
- Root Spring Scraper Co.

**Clusters and Sockets**
- General Electric Co.

**Coal and Ash Handling—(See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
- Columbia M. W. & M. I. Co.
- Electric Service Supplies Co.

**Coils, Armature and Field**
- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse Elec. & M. Co.

**Coils, Choke and Kicking**
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & M. Co.

**Coin-Counting Machines**
- Electric Service Supplies Co.
- International Register Co., The
- Johnson Fare Box Co.

**Commutator Slotters**
- Electric Service Supplies Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
- General Electric Co.

**Commutators or Parts**
- Cameron Electrical Mfg. Co.
- Cleveland Armature Works
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
- Allis-Chalmers Mfg. Co.
- General Electric Co.
- Westinghouse Trac. B. Co

**Condensers**
- General Electric Co.
- Schutte & Koerting Co.
- Westinghouse Elec. & Mfg. Co.

**Conduits, Underground**
- Standard Underground Cable Co

**Condulets, or Conduit Fittings**
- Crouse-Hinds Co.

**Connectors, Solderless**
- Westinghouse Elec. & Mfg. Co.

**Controllers or Parts**
- Columbia M. W. & M. I. Co.
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
- Electric Service Supplies Co.

**Controlling Systems**
- General Electric Co.
- Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
- General Electric Co.
- Westinghouse Elec. & Mfg. Co

**Conveying and Hoisting Machinery**
- Columbia M. W. & M. I. Co

**Copper Wire**
- Anaconda Copper Mining Co.
- Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
- Brill Co., The J. G.
- Electric Service Supplies Co
- International Register Co. The
- Roeblings Sons Co., John A
- Samson Cordage Works

**Cord Connectors and Couplers**
- Electric Service Supplies Co
- Samson Cordage Works
- Wood Co., Chas. N.

**Couplers, Car**
- American Steel Foundries
- Brill Co., The J. G.
- Ohio Brass Co.
- Van Dorn Coupler Co.
- Westinghouse Trac. B. Co

**Cranes**
- Niles-Bement-Pond Co.
- Toledo Bridge & Crane Co Th

**Cross Arms. (See Brackets)**

**Crossing Foundations**
- International Steel Tie Co

**Crossings, Frogs and Switches**
- Wharton, Jr. & Co., Inc., Wm

**Crossings, Manganese**
- Indianapolis Switch & Frog Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Track. (See Track, Special Work)**

**Culverts**
- Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
- Brill Co., The J. G.
- Electric Service Supplies Co
- Pantasote Co.
- St. Louis Car Co.

**Dealers' Machinery**
- Archer & Baldwin
- Cleveland Armature Wks.
- Electric Equipment Co.
- Griswold Machine Co., Geo. M.
- Transit Equipment Co.
- Zelnicker Supply Co., Inc., Walter A.

**Destination Signs**
- Columbia M. W. & M. I. Co.
- Creaghead Eng. Co.
- Electric Service Supplies Co.

**Detective Service**
- Wish Service, P. Edward

**Dogs, Lathe**
- Williams & Co., J. H.

**Door Operating Devices**
- Consolidated Car Heating Co.
- National Pneumatic Co., Inc
- Safety Car Devices Co.

**Doors and Door Fixtures**
- Brill Co., The J. G.
- General Electric Co.

**Doors, Folding Vestibule**
- National Pneumatic Co., Inc.

**Door and Shutters, Fireproof**
- Kinnear Mfg. Co.

**Doors, Steel Rolling**
- Kinnear Mfg. Co.

**Draft Rigging. (See Couplers)**

**Drills, Track**
- American Steel & Wire Co.
- Electric Service Supplies Co
- Niles-Bement-Pond Co.
- Ohio Brass Co.

**Dryers, Sand**
- Electric Service Supplies Co.
- Zelnicker Supply Co., Walter A., Inc.

**Electrical Wires and Cables**
- American Electrical Works
- Roebling's Sons Co., J. A

**Electrically Operated Switches (Air or Oil)**
- Condit Electrical Mfg. Co.

**Electrodes, Carbon**
- Indianapolis Switch & Frog Co.

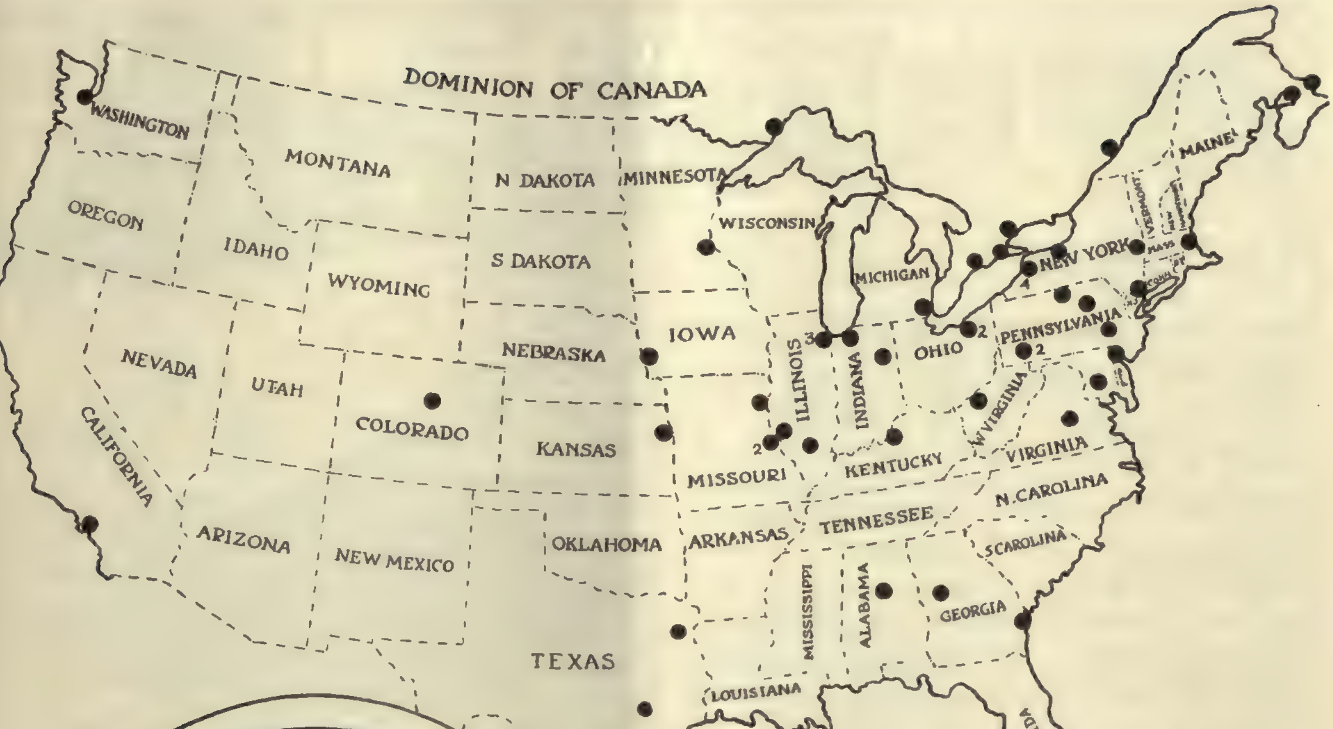
**Electrodes, Steel**
- Indianapolis Switch & Frog Co.

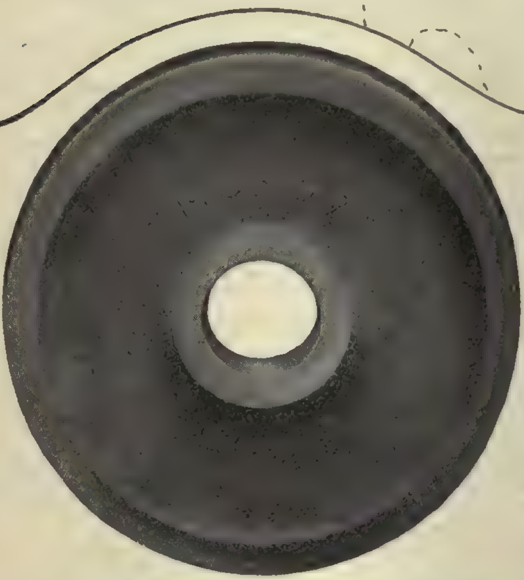
**Engineers, Consulting, Contracting and Operating**
- Allison & Co., J. E.
- Archbold-Brady Co.
- Arnold Co., The
- Beeler, John A.
- Clark Management Corp S W
- Day & Zimmermann, Inc.
- Drum & Co., A. L.
- Feustel, Robert M.
- Ford, Bacon & Davis
- Hemphill & Wells
- Holst, Englehardt W.
- Jackson, Walter
- Parsons, Klapp, Brinkerhoff & Douglas
- Richey, Albert S.
- Sanderson & Porter
- Scofield Engineering Co.
- Smith & Co., C. E.
- Stone & Webster

**Engines, Gas, Oil and Steam**
- Westinghouse Elec. & Mfg. Co.

**Expansion Joints, Track**
- Wharton, Jr. & Co., Inc., Wm.

**Fare Boxes**
- Cleveland Fare Box Co.
- Johnson Fare Box Co
- National Railway Appliance Co.
- Ohmer Fare Register Co.





49 The map above shows the location of the 49 foundries in the United States and Canada, represented by the Association of Manufacturers of Chilled Car Wheels

Chicago 3
St. Louis 2
Buffalo 4
Pittsburg 2
Cleveland 2
Amherst N.S.
Montreal
Mich. City, Ind
Louisville
Mt Vernon, Ill
Ft. Wayne, Ind
Birmingham
Atlanta
Savannah

Boston
Detroit
St. Paul
Kansas City, Kan
Denver
Tacoma
Rochester, N.Y.
Savre, Pa
Berwick, Pa.
Albany
Toronto
New Glasgow N.S
Madison, Ill.

Huntingdon W Va
Wilmington, Del
Houston, Tex
Hannibal Mo
Reading, Pa
Baltimore
Richmond, Va
Ft. William, Ont
St. Thomas, -
Hamilton,
Ramapo, N.Y
Marshall, Tex
Los Angeles
Council Bluffs

AMERICAN RAILROAD ASSOCIATION STANDARDS

*650 lb. wheel for 60,000 Capacity Cars*
*700 lb. wheel for 80,000 Capacity Cars*
*750 lb. wheel for 100,000 Capacity Cars*
*850 lb. wheel for 140,000 Capacity Cars*

The Standard Wheel for Seventy Years

Where

**CHILLED IRON WHEELS**

*are made for Railway and Street Car Service*

*Capacity 20,000 per day*
*25,000,000 in Service*

Association of Manufacturers of Chilled Car Wheels

*1847 Mc Cormick Bldg.*
CHICAGO

# WHAT AND WHERE TO BUY

**Feed Water Heating**
**Schutte & Koerting Co.**

**Fences, Woven Wire and Fence Posts**
**American Steel & Wire Co.**
Camrbia Steel Co.
Midvale Steel & Ordnance Co.

**Fenders and Wheel Guards**
**Brill Co., The J. G.**
**Cleveland Fare Box Co.**
**Consolidated Car Fender Co.**
**Electric Service Supplies Co.**
Root Spring Scraper Co.
**Star Brass Works.**

**Fibre and Fibre Tubing**
**Continental Fibre Co.**
**Westinghouse Elec. & Mfg. Co.**

**Field Coils. (See Coils)**

**Filters, Water**
**Scaife & Sons Co., Wm. B.**

**Flaxlinum Insulation**
**National Railway Appliance Co.**

**Floodlights**
Crouse-Hinds Co.
**Electric Service Supplies Co.**

**Floor Plates**
**American Abrasive Metals Co.**

**Flooring Composition**
**American Mason Safety Tread Co.**

**Forgings**
Carnegie Steel Co.
**Columbia M. W. & M. I. Co**
**Standard Steel Works Co.**
**Williams & Co., J. H.**

**Frogs, Track. (See Track Work)**

**Fuses and Fuse Boxes**
**Columbia M. W. & M. I. Co.**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**
**Williams & Co., J. H.**

**Fuses, Refillable**
**Columbia M. W. & M. I. Co.**
**General Electric Co.**

**Gaskets**
**Power Specialty Co.**
**Westinghouse Traction Brake Co.**

**Gas-Electric Cars**
**General Electric Co.**

**Gas Producers**
**Westinghouse Elec. & Mfg. Co.**

**Gates, Car**
**Brill Co., The J. G.**

**Gear Blanks**
Cambria Steel Co.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.
**Standard Steel Works Co.**

**Gear Cases**
**Columbia M W. & M. I. Co.**
**Electric Service Supplies Co.**
**Westinghouse Elec. & Mfg. Co.**

**Gears and Pinions**
Bemis Car Truck Co.
**Columbia M. W. & M. I. Co.**
**Electric Service Supplies Co.**
**General Electric Co.**
**National Railway Appliance Co.**
Nuttall Co. R. D.
**Tool Steel Gear & Pinion Co.**

**Generating Sets, Gas-Electric**
**General Electric Co.**

**Generators**
**English Electric Co., Ltd.**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

**Goggles, Eye**
Indianapolis Switch & Frog Co.

**Gongs. (See Bells and Gongs)**

**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**
Indianapolis Switch & Frog Co.
**Metal & Thermit Corp.**
**Railway Track-work Co.**

**Grinding Blocks and Wheels**
**Railway Track-work Co.**

**Guards, Trolley**
**Electric Service Supplies Co.**
**Ohio Brass Co.**

**Hacksaws**
Gladium Co., Inc.

**Harps, Trolley**
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
**Electric Service Supplies Co.**
Hensley Trolley & Mfg Co
More-Jones Brass & Metal Co.
**Nuttall Co., R. D.**
**Star Brass Works**

**Headlights**
**Electric Service Supplies Co.**
**General Electric Co.**
Ohio Brass Co
**St. Louis Car Co.**

**Headlining**
Haskelite Mfg. Co.
**Pantasote Co.**

**Heaters, Car (Electric)**
**Consolidated Car Heating Co.**
**Gold Car Heating & Lighting Co**
**National Railway Appliance Co**
**Smith Heater Co., Peter**

**Helmets, Welding**
Indianapolis Switch & Frog Co.

**Heaters, Car, Hot Air and Water**
**Cooper Heater Co.**
**Smith Heater Co., Peter**

**Heaters, Car (Stove)**
**Electric Service Supplies Co.**
**Smith Heater Co., Peter**

**Hoists and Lifts**
**Columbia M. W. & M. I. Co.**
**Ford-Chain Block Co.**
**Niles-Bement-Pond Co.**
**Yale & Towne Mfg. Co.**

**Hose, Bridges**
**Ohio Brass Co.**

**Hydraulic Machinery**
**Niles-Bement-Pond Co.**
**Watson-Stillman Co.**

**Hydrogrounds**
Horne Mfg. Co.

**Injectors**
**Schutte & Koerting Co.**

**Instruments, Measuring, Testing and Recording**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

**Insulating Cloth, Paper and Tape**
**Anchor Webbing Co.**
**General Electric Co.**
**Hope Webbing Co.**
**Westinghouse Elec. & Mfg. Co.**

**Insulating Machinery**
**American Insulating Machinery Co.**

**Insulation. (See also Paints)**
**Anderson M. Co., A. & J. M.**
**Electric Ry. Equipment Co.**
**Electric Service Supplies Co.**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

**Insulators. (See also Line Material)**
**Anderson M. Co., A. & J. M.**
**Creaghead Engineering Co.**
**Electric Railway Equipment Co.**
**Electric Service Supplies Co.**
**General Electric Co.**
**Macallen Co., The**
**Ohio Brass Co.**
**Westinghouse Elec. & Mfg. Co.**

**Insulator Pins**
**Electric Service Supplies Co.**
**Hubbard & Co.**

**Inventions Developed & Perfected**
**Peters & Co., G. D.**

**Jacks. (See also Cranes, Hoists and Lifts)**
**Buckeye Jack Mfg Co.**
**Columbia M. W. & M. I. Co.**
**National Ry. Appliance Co.**
**Watson-Stillman Co.**

**Joints, Rail**
**American Chain Co., Inc.**
Carnegie Steel Co.
**Zeinicker Supply Company, Inc., Walter A.**

**Journal Boxes**
Bemis Car Truck Co.
**Brill Co., J. G.**

**Lamp Guards and Fixtures**
**Anderson M. Co., A. & J. M.**
**Electric Service Supplies Co.**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

**Lamps, Arc and Incandescent. (See also Headlights)**
**Anderson M. Co., A. & J. M.**
**General Electric Co.**
**National Electric Specialty Co.**
**Westinghouse Elec. & Mfg. Co.**

**Lamps, Signal and Marker**
**Nichols-Lintern Co.**

**Lanterns, Classification**
Nichols-Lintern Co.

**Lathe Attachments**
**Williams & Co., J. H.**

**Lathes, Car Wheel**
**Niles-Bement-Pond Co.**

**Lightning Protection**
**Anderson M. Co., A. & J. M.**
**Electric Service Supplies Co.**
**General Electric Co.**
**Ohio Brass Co.**
**Westinghouse Elec. & Mfg. Co.**

**Line Material. (See also Brackets, Insulators, Wires, etc.)**
**Anderson M. Co., A. & J. M.**
**Archbold Brady Co.**
**Columbia M. W. & M. I. Co.**
**Creaghead Eng. Co.**
**Electric Railway Equipment Co.**
**Electric Service Supplies Co.**
**English Electric Co., Ltd.**
**General Electric Co.**
**Hubbard & Co.**
**Macallen Co., The**
More-Jones Brass & Metal Co.
**Ohio Brass Co.**
**Westinghouse Elec. & Mfg. Co.**

**Locking Spring Boxes**
**Wharton, Jr. & Co., Inc., Wm.**

**Locomotives, Electric**
**General Electric Co.**
McGuire-Cummings Mfg. Co.
**Westinghouse Elec. & Mfg. Co.**

**Lubricating Engineers**
**Galena-Signal Oil Co.**

**Lubricants, Oil and Grease**
**Borne, Scrymser Co.**
**Galena-Signal Oil Co.**

**Lumber. (See Poles, Ties, etc.)**

**Machine Tools**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.
**Watson-Stillman Co.**

**Manganese Steel, Special Track Work**
**Wharton, Jr. & Co., Inc., Wm.**

**Manganese, Track Work**
Indianapolis Switch & Frog Co.

**Meters. (See Instruments)**
**Electric Service Supplies Co.**

**Mica**
**Macallen Co., The**

**Motor Buses**
Trackless Transportation Co.

**Motormen's Seats**
**Brill Co., J. G.**
**Electric Service Supplies Co.**
**Wood Co., Chas. N.**

**Motors, Electric**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

**Motor and Generator Sets**
**General Electric Co.**

**Mowers, Track**
Rawls Machine & Mfg. Co.

**Nuts and Bolts**
**Barbour-Stockwell Co.**
Bemis Car Truck Co.
**Columbia M. W. & M. I. Co.**
**Hubbard & Co.**

**Ohmmeters**
**Weston Elec'l Instrument Co**

**Oil Burning Equipment**
**Schutte & Koerting Co.**

**Oil Circuit Breaker**
Condit Electrical Mfg. Co.

**Oils. (See Lubricants)**

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**Omnibuses**
Trackless Transportation Co.

**Packing**
**Power Specialty Co.**
**Westinghouse Traction Brake Co**

**Paints and Varnishes for Woodwork**
**National Ry. Appliance Co.**

**Panelboards**
Crouse-Hinds Co.

**Paving Bricks, Filler & Stretcher**
**Nelsonville Brick Co.**

**Paving Material**
American Brake Shoe & Fdry. Co
**Nelsonville Brick Co.**

**Pickups, Trolley Wire**
**Electric Service Supplies Co.**
**Ohio Brass Co.**

**Pinion Pulleys**
**Columbia M. W. & M. I. Co.**
**Electric Service Supplies Co.**
General Electric Co.
**Wood Co., Chas. N.**

**Pinions. (See Gears)**

**Pins, Case Hardened, Wood and Iron**
Bemis Car Truck Co.
**Electric Service Supplies Co.**
**Ohio Brass Co.**
**Westinghouse Traction Brake Co**

**Pipe**
**National Tube Co.**

**Pipe Fittings**
**Power Specialty Co.**
**Standard Steel Works Co.**
**Watson-Stillman Co.**
**Westinghouse Traction Brake Co**

**Planers. (See Machine Tools)**

**Pliers, Insulated**
**Electric Service Supplies Co.**

**Pole Reinforcing**
**Hubbard & Co.**

**Poles, Metal Street**
**Bates Expanded Steel Truss Co**
**Electric Railway Equipment Co.**
**Hubbard & Co.**

**Poles, Ties Post, Piling & Lumber**
**Duncan Lumber Co.**
Page & Hill Co.
**Southern Cypress Mfg. Assn.**

**Poles and Ties Treated**
Page & Hill Co.

**Poles, Trolley**
**Anderson Mfg. Co., A. & J. M.**
Bayonet Trolley Harp Co.
**Columbia M. W. & M. I. Co.**
**Electric Service Supplies Co.**
**National Tube Co.**
**Nuttall Co., R. D.**

**Poles, Tubular Steel**
**Electric Railway Equipment Co.**
**National Tube Co.**

**Power Saving Devices**
**National Railway Appliance Co.**

**Pressure Regulators**
General Electric Co.
**Westinghouse Elec. & Mfg. Co.**

**Pumps**
Schutte & Koerting Co.
**Watson-Stillman Co.**

**Punches, Ticket**
**Bonney-Vehslage Tool Co.**
**International Register Co., The**
**Wood Co., Chas. N.**

**Punching Machinery**
**Watson-Stillman Co.**

**Purifiers, Feed Water**
**Scaife & Sons Co., Wm. B**

**Rails**
Cambria Steel Co.
Carnegie Steel Co.
**Foster & Co., L. B.**
Midvale Steel & Ordnance Co.

**Rail Grinders. (See Grinders)**

**Rail Joint, Welded**
Indianapolis Switch & Frog Co.

**Railway Safety Switches**
**Westinghouse Elec. & Mfg. Co.**

**Rail Welding. (See Welding Processes**
**Foster & Co., L. B.**
Rail Welding & Bonding Co.
**Zeinicker, Walter A., Supply Co., Inc.**

**Rattan**
American Rattan & Reed Mfg. Co.
**Brill Co., The J. G.**
**Electric Service Supplies Co.**
McGuire-Cummings Mfg. Co.
**St. Louis Car Co.**

**Registers and Fittings**
**Brill Co., The J. G.**
**Electric Service Supplies Co.**
**International Register Co., The**
**Ohmer Fare Register Co.**
**Rooke Automatic Register Co.**

**Reinforcement, Concrete**
**American Steel & Wire Co.**
Carnegie Steel Co.

**Repair Shop Appliances. (See also Coil Banding and Winding Machines)**
Columbia M. W. & M. I. Co.
**Electric Service Supplies Co**

**Repair Work. (See also Coils)**
**Cleveland Armature Works**
**Columbia M. W. & M. I. Co.**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

**Replacers, Car**
**American Chain Co., Inc.**
**Columbia M. W. & M. I. Co.**
**Electric Service Supplies Co.**

**Resistance, Grid**
**Columbia M. W. & M. I. Co.**

**Resistance, Wire and Tube**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

**Retrievers, Trolley. See Catchers and Retrievers, Trolley)**

**Rheostats**
**General Electric Co.**
**Westinghouse Elec. & Mfg. Co.**

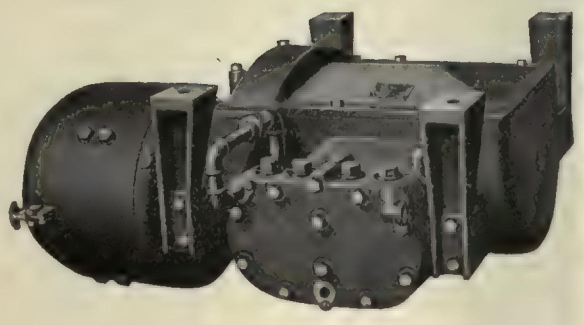
**Rolled Steel Wheels**
Cambria Steel Co.
Midvale Steel & Ordnance Co.

**Roofing, Car**
**Pantasote Co.**
**Haskelite Mfg. Co.**

**ALLIS-CHALMERS**

**Type AA-1B Compressors**

***for Air Brake Service***



A newly designed compressor embodying many new features.

Designed for 120 lb. pressure intermittent service (30 min. per hour).

Low height makes them exceedingly adaptable on low floor type cars.

Gears are independent from crankshaft, power being transmitted through flexible coupling.

***Write for full particulars.***

**ALLIS-CHALMERS, MILWAUKEE**

Service Value

*Scrap value* for idle used machinery or surplus material is not enough. If it can be used by others they will pay *service value* for it. "Searchlight" will find these buyers for you.

Manufacturers who accept used machinery in part payment for new can dispose of it promptly by advertising in the Searchlight Section.

Machinery used in manufacturing and displaced by other equipment can be sold at a fair price by advertising it in the Searchlight Section.

Wide-awake dealers, agents or representatives can be secured through little Searchlight "Want" ads.

Manufacturing sites, partners, help, capital —anything that anybody in the machinery field is likely to have for sale or exchange for something else—can be located or disposed of through the Searchlight Section.

The cost of putting your Wants in this projector is very slight, whether for a man, for a job or for a market.

Searchlight Section

# WHAT AND WHERE TO BUY

**Sand Boxes**
  Horne Mfg. Co.

**Sanders, Track**
  Brill Co., The J. G.
  Columbia M. W. & M. I Co.
  Electric Service Supplies Co.
  Nichols-Lintern Co.
  Ohio Brass Co.
  St. Louis Car Co.

**Sash Fixtures, Car**
  Brill Co., The J. G.

**Scrapers, Track. (See Cleaners and Scrapers, Track)**

**Seating Materials**
  Brill Co., J. G.
  Pantasote Co.
  St. Louis Car Co.

**Seats, Car.. (See also Rattan)**
  American Rattan & Reed Mfg. Co.
  Brill Co., The J. G.
  Peters & Co., G. D.
  St. Louis Car Co.

**Second-Hand Equipment**
  Archer & Baldwin
  Electric Equipment Co.
  Foster Co., H. M.
  Griswold Machine Co., G. M.
  Transit Equipment Co.
  Zelnicker Supply Co., Inc.. Walter A.

**Shades, Vestibule**
  Brill Co., The J. G.

**Shovels**
  Hubbard & Co.

**Shovels, Power**
  Brill Co., The J. G.

**Signals, Car Starting**
  Consolidated Car Heating Co.
  Electric Service Supplies Co.
  National Pneumatic Co., Inc.

**Signals, Indicating**
  Nichols-Lintern Co.

**Signal Systems, Block**
  Electric Service Supplies Co.
  Nachod Signal Co., Inc.
  Union Switch & Signal Co.
  U. S. Electric Signal Co.
  Wood Co., Chas. N.

**Signal Systems, Highway Crossing**
  Nachod Signal Co., Inc.
  U. S. Electric Signal Co.

**Slack Adjusters. (See Brake Adjusters)**

**Slag**
  Carnegie Steel Co.

**Sleet Wheels and Cutters**
  Anderson Mfg Co., A. & J. M.
  Bayonet Trolley Harp Co.
  Columbia M. W. & M. I. Co.
  Electric Railway Equipment Co.
  More-Jones Brass & Metal Co.
  Nuttall Co., R. D.

**Smokestacks, Car**
  Nichols-Lintern Co.

**Snow-Plows, Sweepers and Brooms**
  American Rattan & Reed Mfg. Co.
  Brill Co., The J. G.
  Columbia M. W. & M. I. Co.
  Consolidated Car Fender Co.
  McGuire-Cummings Mfg. Co.

**Soldering and Brazing. (See Welding Processes and Apparatus.)**
  American Steel & Wire Co.
  Lackawanna Steel Co.

**Spikes**
  Amer. Steel & Wire Co.

**Splicing Compounds**
  Westinghouse Elec. & Mfg. Co.

**Splicing Sleeves. (See Clamps and Connectors)**

**Spray Nozzles**
  Schutte & Koerting Co.

**Springs, Car and Truck**
  American Steel & Wire Co.
  Bemis Car Truck Co.
  Brill Co., The J. G.
  Fort Pitt Spring & Mfg. Co.
  Standard Steel Works Co.
  Taylor Electric Truck Co.

**Sprinklers, Track and Road**
  Brill Co., The J. G
  McGuire-Cummings Mfg. Co.
  St. Louis Car Co.

**Steps, Car**
  American Abrasive Metals Co.
  American Mason Safety Tread Co

**Stokers, Mechanical**
  Babcock & Wilcox Co
  Westinghouse Elec. & Mfg. Co.

**Storage Batteries. (See Batteries, Storage)**

**Strand**
  Copper Clad Steel Co.
  Roebling's Sons Co., J. A.

**Superheaters**
  Babcock & Wilcox Co.
  Power Specialty Co.

**Sweepers, Snow. (See Snow Plows, Sweepers and Brooms)**

**Switch Boxes**
  Crouse-Hinds Co.

**Switch Stands**
  Indianapolis Switch & Frog Co.
  Ramapo Iron Works

**Switches, Selector**
  Nichols-Lintern Co.

**Switches, Track. (See Track, Special Work)**

**Switches and Switchboards**
  Anderson Mfg. Co A. & J. M.
  Condit Electrical Mfg. Co.
  Crouse-Hinds Co.
  Cutter Co.
  Electric Service Supplies Co.
  General Electric Co.
  Westinghouse Elec. & Mfg. Co.

**Tapes and Cloths. (See Insulating Cloth, Paper and Tape)**

**Telephones and Parts**
  Electric Service Supplies Co.

**Testing Instruments. (See Instruments, Electrical Measuring, Testing, etc.)**

**Thermostats**
  Consolidated Car Heating Co.
  Gold Car Heating & Lighting Co.
  Railway Utility Co.
  Smith Heater Co., Peter

**Thread-Cutting Tools**
  Williams & Co., J. H.

**Ticket Choppers and Destroyers**
  Electric Service Supplies Co

**Ties, Mechanical**
  Dayton Mechanical Tie Co.

**Tie Plates**
  Cambria Steel Co.
  Midvale Steel & Ordnance Co.

**Ties and Tie Rods, Steel**
  Barbour-Stockwell Co
  International Steel Tie Co.

**Ties, Wood Cross. (See Poles, Ties, Posts, etc.)**

**Tongue Switches**
  Wharton, Jr. & Co., Inc., Wm.

**Tool Holders**
  Williams & Co., J. H.

**Tool Steel**
  Cambria Steel Co.
  Carnegie Steel Co.
  Midvale Steel & Ordnance Co.

**Tools, Track and Miscellaneous**
  Advance Tool & Mfg. Co.
  American Steel & Wire Co.
  Columbia M. W. & M. I. Co.
  Electric Service Supplies Co.
  Hubbard & Co.
  Railway Track-work Co.

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  Williams & Co., J. H.

**Towers and Transmission Structures**
  Archbold-Brady Co.
  Bates Expanded Steel Truss Co
  Westinghouse Elec. & Mfg. Co.

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  Trackless Transportation Co.

**Trackmowers**
  Rawls Machine & Mfg. Co.

**Track, Special Work**
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  Indianapolis Switch & Frog Co.
  New York Switch & Crossing Co
  Ramapo Iron Works
  St. Louis Frog & Switch Co
  Wharton Jr. & Co., Inc., Wm.

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  Ohmer Fare Register Co.

**Transfer Tables**
  Archbold Brady Co.

**Transfers. (See Tickets)**
  Archbold-Brady Co.

**Transformers**
  General Electric Co.
  Westinghouse Elec. & Mfg. Co.

**Treads, Safety, Stair, Car Step**
  American Abrasive Metals Co.
  American Mason Safety Tread Co

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  Anderson Mfg. Co., A. & J. M
  Electric Service Supplies Co.
  General Electric Co.
  Horne Mfg. Co.
  National Railway Appliance Co
  Nuttall Co., R. D.
  Ohio Brass Co.

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  General Electric Co.
  More-Jones Brass & Metal Co
  National Ry. Appliance Co
  Nuttall Co., R. D.
  Ohio Brass Co.

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  Ohio Brass Co.

**Trolleys and Trolley Systems**
  Ford Chain Block Co

**Trolley Shoes**
  Holden & White, Inc.

**Trolley Wheels. (See Wheels, Trolley)**

**Trolley Wire**
  American Electrical Works
  American Steel & Wire Co
  Anaconda Copper Mining Co.
  Copper Clad Steel Co.
  Roebling's Sons Co., John A

**Trucks, Car**
  Bemis Car Truck Co.
  Brill Co., The J. G.
  McGuire-Cummings Mfg. Co.
  St. Louis Car Co.
  Taylor Electric Truck Co.

**Tubing, Steel**
  National Tube Co.

**Turbines, Steam**
  General Electric Co.
  Terry Steam Turbine Co.
  Westinghouse Elec. & Mfg. Co.

**Turnstiles**
  Perey Mfg. Co., Inc.

**Upholstery Materials**
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  Schutte & Koerting Co
  Westinghouse Traction Brake Co

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  Brill Co., The J. G.
  National Railway Appliance Co
  Nichols-Lintern Co.
  Railway Utility Co.
  St. Louis Car Co.

**Vises, Pipe**
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**Water Softening and Purifying Systems**
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  Ohio Brass Co.
  Rail Welding & Bonding Co.

**Welding Processes and Apparatus**
  Electric Railway Improvement Co.
  General Electric Co.
  Indianapolis Switch & Frog Co.
  Metal & Thermit Corp
  National Ry Appliance Co.
  Ohio Brass Co.
  Rail Welding & Bonding Co.
  Westinghouse Elec. & Mfg. Co

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  Ohio Brass Co.
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**Wheel Grinders**
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**Wheel Presses. (See Machine Tools)**

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  Carnegie Steel Co.
  Standard Steel Works Co.

**Wheels, Trolley**
  Anderson Mfg. Co., A. & J. M.
  Bayonet Trolley Harp Co.
  Columbia M. W. & M. I. Co.
  Electric Railway Equipment Co
  Electric Service Supplies Co.
  General Electric Co
  More-Jones Brass & Metal Co.
  Nuttall Co., R. D.
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  American Steel & Wire Co
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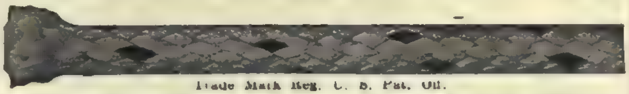

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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Ajax Metal Co. 57
Allis-Chalmers Mfg. Co. 55
Allison Co., J. E. 30
American Abrasive Metal Co. 58
Amer. Brake Shoe & Fdry. Co. 48
American Chain Co., Inc. 36
American Electrical Works 42
American Insulating Machinery Co. 42
American Mason S. T. Co. 56
American Rattan & Reed Mfg. Co. 58
American Steel Foundries 49
American Steel & Wire Co. 31
Anaconda Copper Mining Co. 42
Anchor Webbing Co. 46
Anderson Mfg. Co., A. & J. M. 37
Archbold-Brady Co. 42
Archer & Baldwin, Inc. 50
Arnold Co., The 30
Assn. Mfrs. Chilled Car Wheels 53

B

Babcock & Wilcox Co. 44
Barbour-Stockwell Co. 43
Bates Expanded Steel Truss Co. 35
Bayonet Trolley Harp Co. 35
Beeler, John A. 30
Bemis Car Truck Co. 57
Bennett Field Cross Tie Co. 42
Bonney-Vehslage Tool Co. 47
Borne, Scrymser Co. 45
Bound Brook Oil-less Bearing Co. 57
Brill Co., The J. G. 61
Buckeye, Jack, Mfg. Co. 46

C

Cambria Steel Co. 36
Cameron Electrical Mfg. Co. 49
Canton Culvert & Silo Co. 37
Carnegie Steel Co. 40
Clark Mgr. Corp., E. W. 31
Cleveland Fare Box Co. 46
Coal & Iron Nat'l Bank 31
Collier, Inc., Barron G. 59
Columbia M. W. & M. I. Co. 60
Condit Elect'l Mfg. Co. 21
Consolidated Car Fender Co. 22
Consolidated Car Heating Co. 47
Continental Fibre Co., The 47
Copper Clad Steel Co. 42
Cooper Heater Co., The 47
Creaghead Engineering Co. 48
Crouse-Hinds Co. 19
Cutter Co. 4

D

Page

Day & Zimmermann, Inc. 31
Dayton Mechanical Tie Co. 15
Differential Steel Car Co., The 14, 49
Drum & Co., A. I. 30
Duncan Lumber Co. 42

E

Earll, C. I. 48
Eastern Mass. Ry. Co. 50
Electric Equipment Co. 50
Electric Ry. Equipment Co. 10
Electric Ry. Improvement Co. 44
Electric Service Supplies Co. 11
English-Electric Co., The, Ltd. A

F

Feustel, Robt. M. 30
Flood City Mfg. Co. 43
Ford, Bacon & Davis 30
Ford Chain Block Co. 45
"For Sale" Ads 50, 51
Fort Pitt Spring & Mfg. Co. 49

G

Galef, J. L. 46
Galena-Signal Oil Co. 27
General Electric Co. 28
Gladium Co. Inc. 58
Gold Car Heating & Ltg. Co. 47
Gould, L. E. 36

H

Haskelite Mfg. Corp. 48
"Help Wanted" Ads 50
Hemphill & Wells 30
Hensley Trolley & Mfg. Co. 17
Holst, Englehardt W. 30
Hope, Webbing Co. 45
Horne Mfg. Co. 56
Hubbard & Co. 43

I

Indianapolis Switch & Frog Co. 18
International Register Co., The 38
Internat'l Steel Tie Co., The 9

J

Jackson, Walter 30
Jeandron, W. J. 48
Johnson Fare Box Co. 46

K

Page

Kerite Insulated Wire & Cable Co. 42
Kinnear Mfg. Co., The 38

M

McGuire-Cummings Mfg. Co. 25
Macallen Co., The 31
Metal & Thermit Corp. 43
Midvale Steel & Ordnance Co. 36
More-Jones Brass Metal Co. 24

N

Nachod Signal Co. 43
National Brake Co. 29
Nat'l Pneumatic Co., Inc. 13
Nat'l Ry. Appliance Co. 47
National Tube Co. 23
Nelsonville Brick Co. 43
N. Y. Switch & Crossing Co. 43
Nicholas-Lintern Co. Front Cover
Niles-Bement-Pond Co. 46
Nuttall Co., R. D. 40

O

Ohio Brass Co. 7
Ohmer Fare Register Co. 20
Ordnance Works A

P

Page & Hill Co. 33
Pantasote Co. 12
Parsons, Klapp, Brinckerhoff & Douglas 30
Perey Mfg. Co., Inc. 47
Peters & Co. 57
Phoenix Works A
Positions Wanted and Vacant 46
Power Specialty Co. 44

R

Rail Welding & Bonding Co. 17
Railway Track-work Co. 16
Railway Utility Co. 49
Ramapo Iron Works 43
Rawls Machine & Mfg. Co. 43
Richey, Albert S. 30
Roebling's Sons Co., John A. 42
Rooke Automatic Register Co. 46
Root Spring Scraper Co. 39

S

Page

Safety Car Devices Co. 5
St. Louis Car Co. 41
Samson Cordage Works 57
Sanderson & Porter 30
Scaife & Sons Co., Wm. B. 44
Schutte & Koerting Co. 44
Searchlight Section 50-51
Siemens Works A
Smith & Co., C. E. 30
Smith Heater Co., Peter 58
Standard Steel Works Co. 34
Star Brass Works 47
Stone & Webster 30
Stucki Co., A. 4

T

Taylor Electric Truck Co. 41
Terry Steam Turbine Co. 46
Thomas, Perley A. 49
Tool Steel Gear & Pinion Co. 26
Trackless Transportation Co. 57

U

Union Switch & Signal Co. 8
U. S. Electric Signal Co. 6

V

Van Dorn Coupler Co. 49

W

"Want" Ads 50
Watson-Stillman Co. 39
Westinghouse Elec. & Mfg. Co. 2
West'gh'se Traction Brake Co. 4
Wharton, Jr. & Co., Wm. 44
Wheel Truing Brake Shoe Co. 47
White Eng. Corp., The J. G. 30
Williams & Co., J. H. 45
Wish Service, The P. Edw. 56
Wood Co., Chas. N. 42

Y

Yale & Towne Mfg. Co. 46

Z

Zelnicker in St. Louis 50

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Employment Equipment Business Opportunities

613

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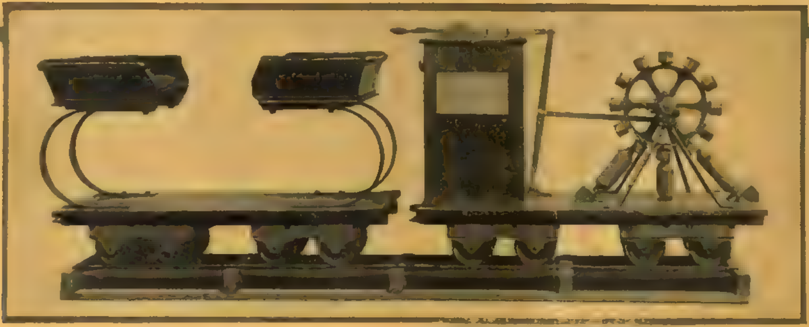

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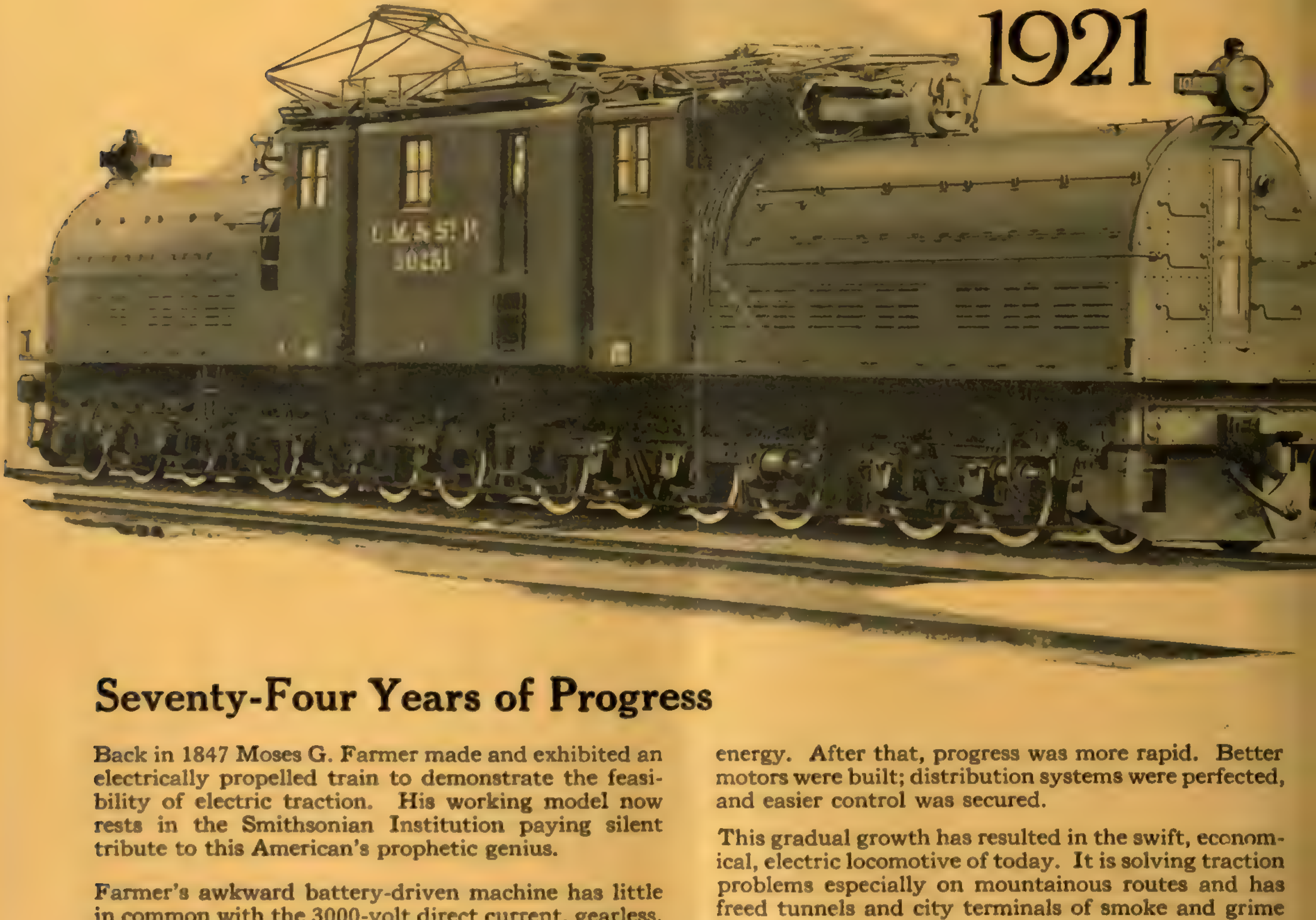

1921

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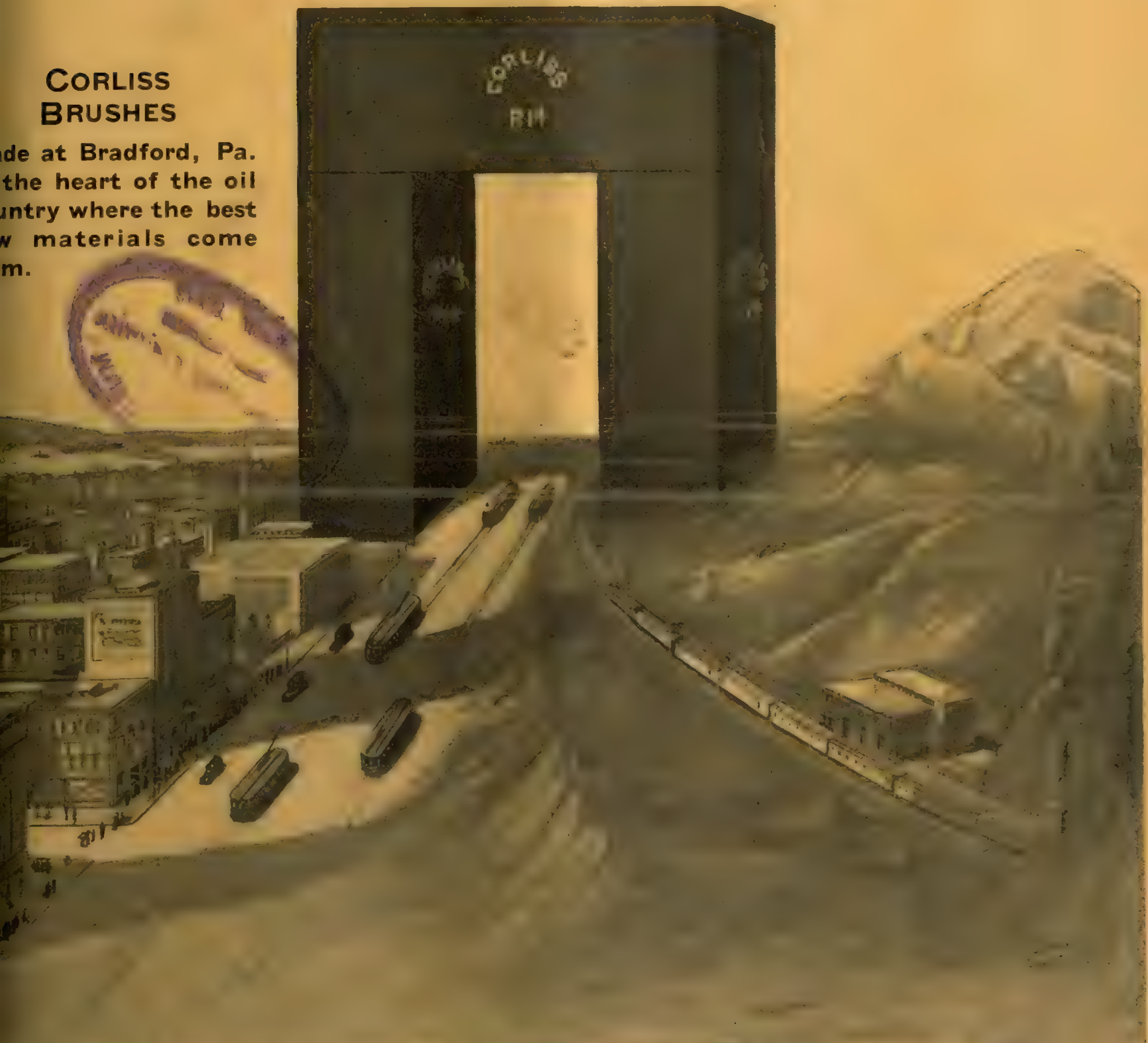

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Many of the claims for credit in the development of the wonderful transportation systems of the present day may or may not be found true on reviewing the past history of the electric railway industry. There are, however, several facts that cannot be clouded with doubt.

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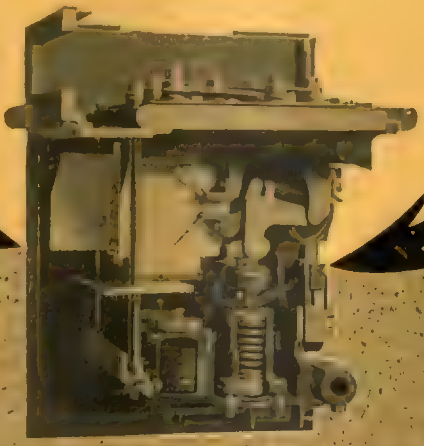

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

# Westinghouse

*Vol. 58, No. 7* New York, August 13, 1921 ***Pages** 229 **to** 266*

# Electric Railway Journal

**Henry W. Blake and Harold V. Bozell, Editors** **Henry H. Norris, Managing-Editor**

## *Contents*

### Methods Used for Cutting Coal Consumption a Third

The improvements made by the engineering department of the American Railways in the power plant of its subsidiary, the Wilmington & Philadelphia Traction Company, reduced labor as well as fuel costs..................Page 232

### Measuring Service to the Public

The riding public is interested in three things: car frequency, speed and fare. How the status of the Winnipeg Railway was set forth in these particulars is explained by C. H. D. Dahl.........................................Page 239

### Co-operation in Securing Community Freight Service

The Kansas City Railways builds a local freight service and the Interstate Commerce Commission grants terminal rates to patrons. The railway now has a prospect of operating this service at a profit..................Page 242

EDITORIALS .............................. 229
DES MOINES LOSES CAR SERVICE ............. 237
NORTH SHORE MAKES SAFETY RECORD......... 238
HOSE BRIDGES CARRIED IN TRAILER........... 241
REMOVAL OF GLUE STAINS.................. 243
NEW PROCESSES FOR TREATING COAL.......... 245
THE SITUATION IN THE PETROLEUM INDUSTRY.. 245

EQUIPMENT AND ITS MAINTENANCE:

Operating Company Builds Switching Locomotive 246
New Oil Circuit Breaker 246
New Cars for Texas Electric Railway 247
Titanium-Treated Rails 248
Fin Nut Lock 248

AMERICAN ASSOCIATION NEWS:

Executive Committee Holds Important Meeting 249
Vernon Room Where the Meetings Will Be Held 250
W. O. Gibson to Be Sentenced 250
Tax Plea Commended 250

NEWS OF THE ELECTRIC RAILWAYS............ 251
FINANCIAL AND CORPORATE.................. 256
TRAFFIC AND TRANSPORTATION............... 259
LEGAL NOTES.............................. 263
PERSONAL MENTION......................... 264
MANUFACTURES AND THE MARKETS........... 265

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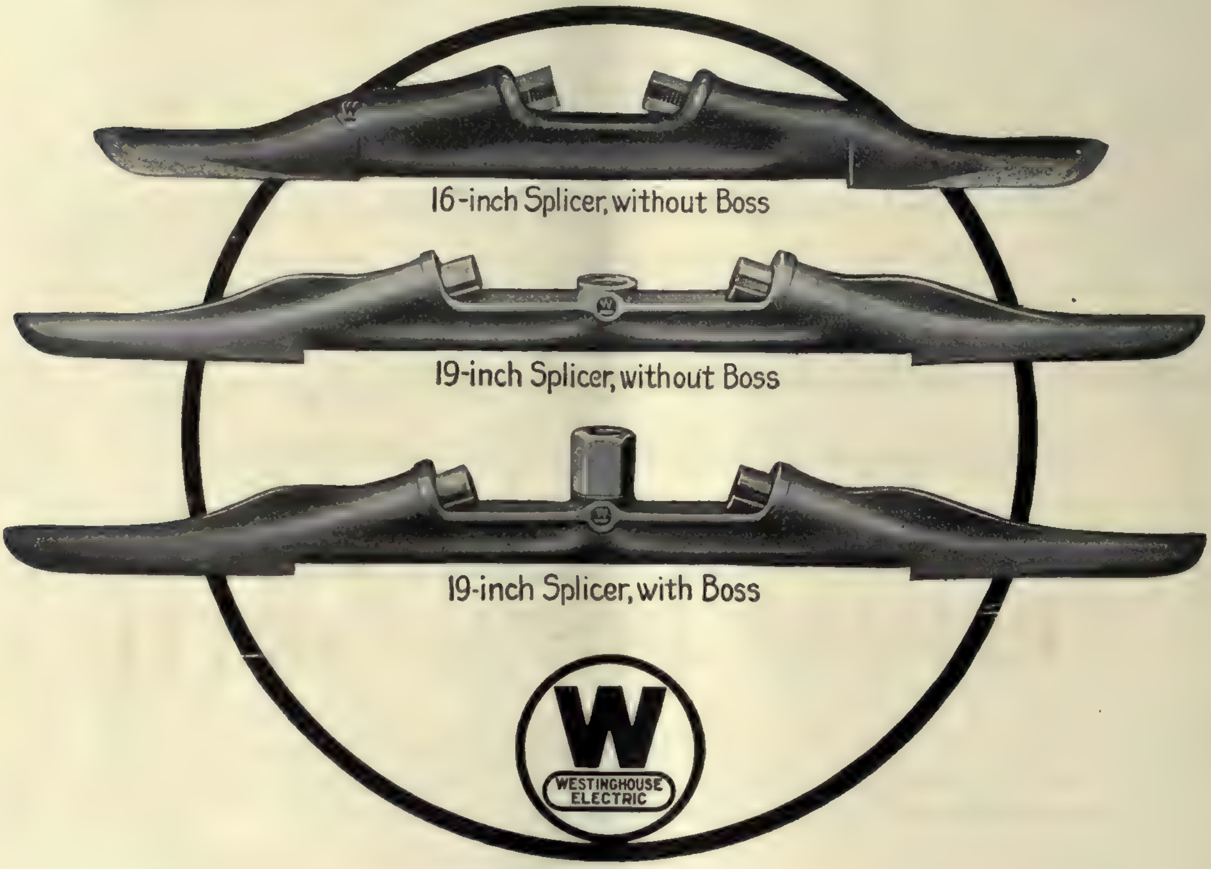

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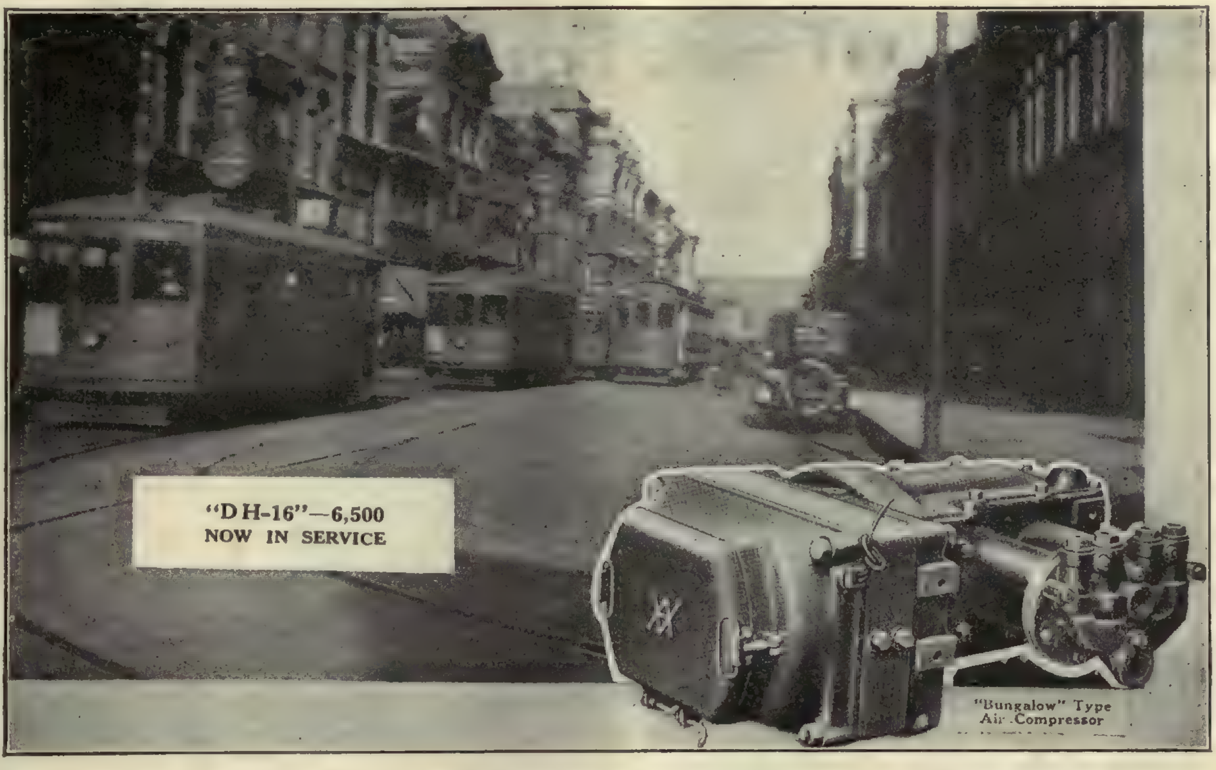

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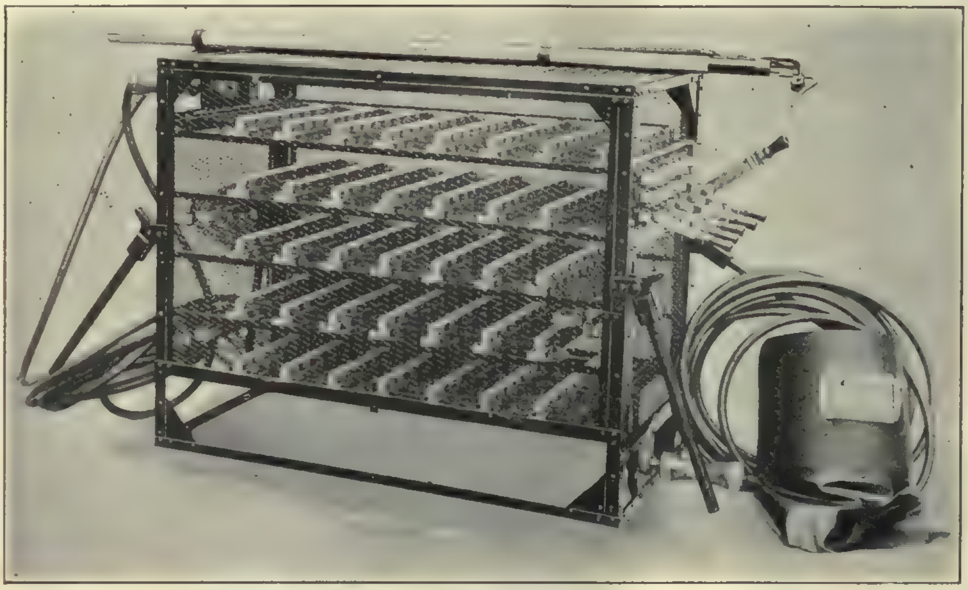
# Save That Track For Another Year!



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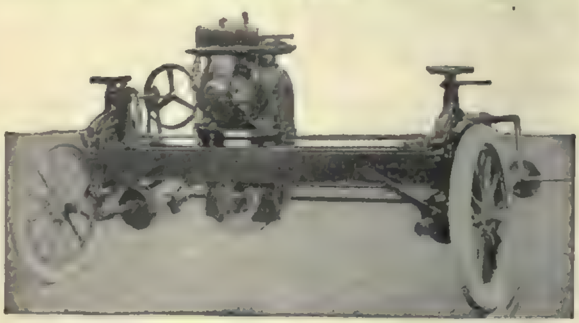

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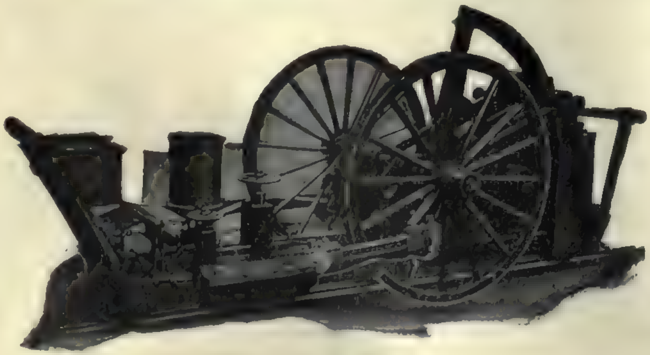

RECIPROCATING Track Grinder

## What Will New Track Cost?

Prices have dropped somewhat, but not yet to pre-war levels. Steel is still 50% above the old scale. Look over your old track, which is getting into pretty bad shape, and you will be surprised how much of it you can put into good operating condition for another year or two, by building up broken places, and grinding down the rough spots.

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Trackless trolley offers a possible solution for certain transportation difficulties. Several railway companies in this country are now considering experimental installations.

In this, as in every radical departure from existing practice, there are problems to be solved. Construction of overhead trolley with positive and negative wires is a new thing for most railway men in this country. Equipment for the buses, particularly the current collecting devices, must be worked out, too.

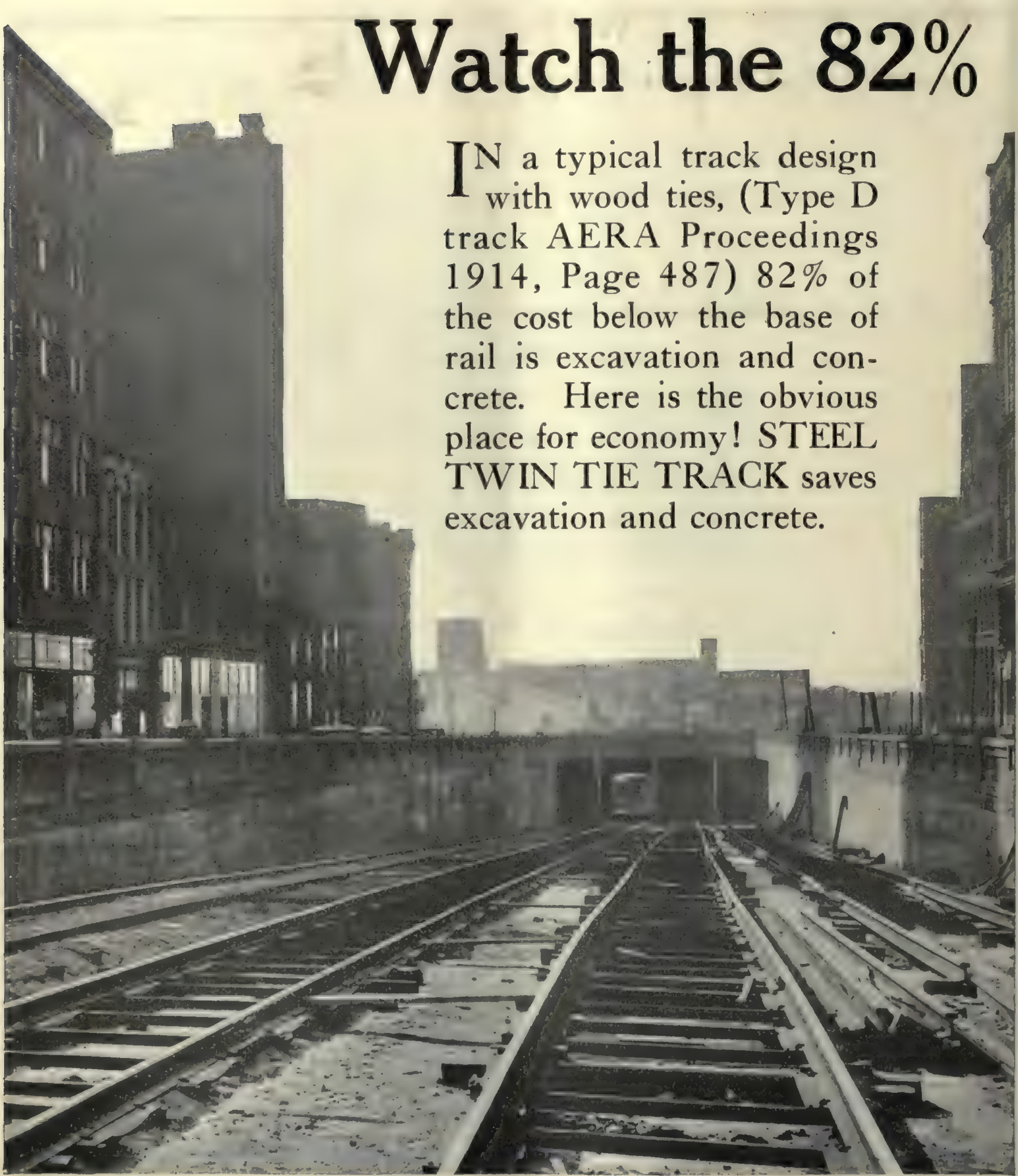
Use of standard materials and following of accepted construction, wherever possible, are desirable from the standpoint of economy and of satisfactory operation by men schooled in electric railway practice.

Experience of others is of immeasurable value in making plans. O-B Engineers have a fund of information on the line material and car equipment phases of the trackless trolley. Their data and cooperation are at your disposal.

***The Ohio Brass Company***
***Mansfield, Ohio***

# Watch the 82%

IN a typical track design with wood ties, (Type D track AERA Proceedings 1914, Page 487) 82% of the cost below the base of rail is excavation and concrete. Here is the obvious place for economy! STEEL TWIN TIE TRACK saves excavation and concrete.



# Steel Twin Tie Track

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# Steel Twin Tie Track

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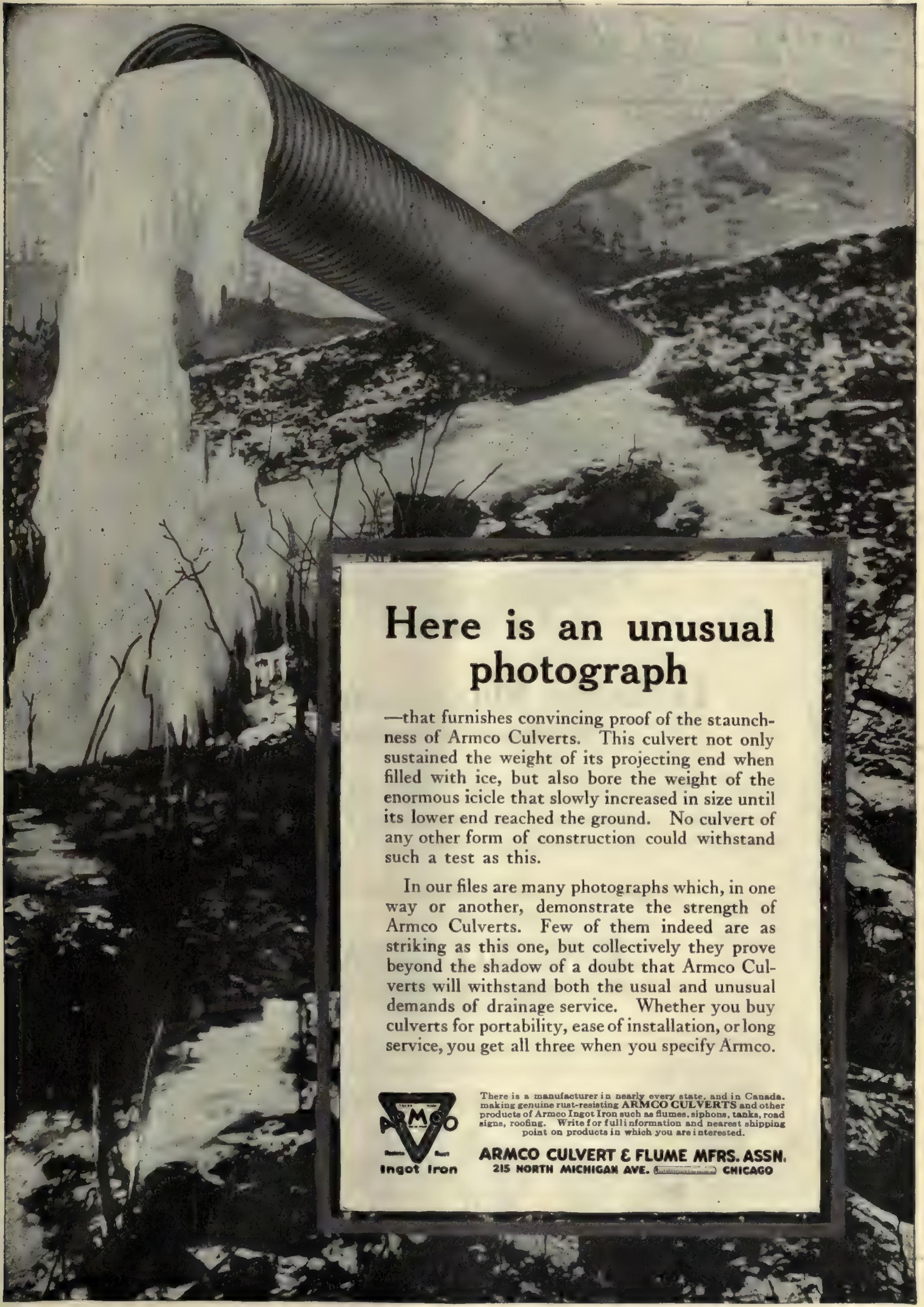

# Here is an unusual photograph

—that furnishes convincing proof of the staunchness of Armco Culverts. This culvert not only sustained the weight of its projecting end when filled with ice, but also bore the weight of the enormous icicle that slowly increased in size until its lower end reached the ground. No culvert of any other form of construction could withstand such a test as this.

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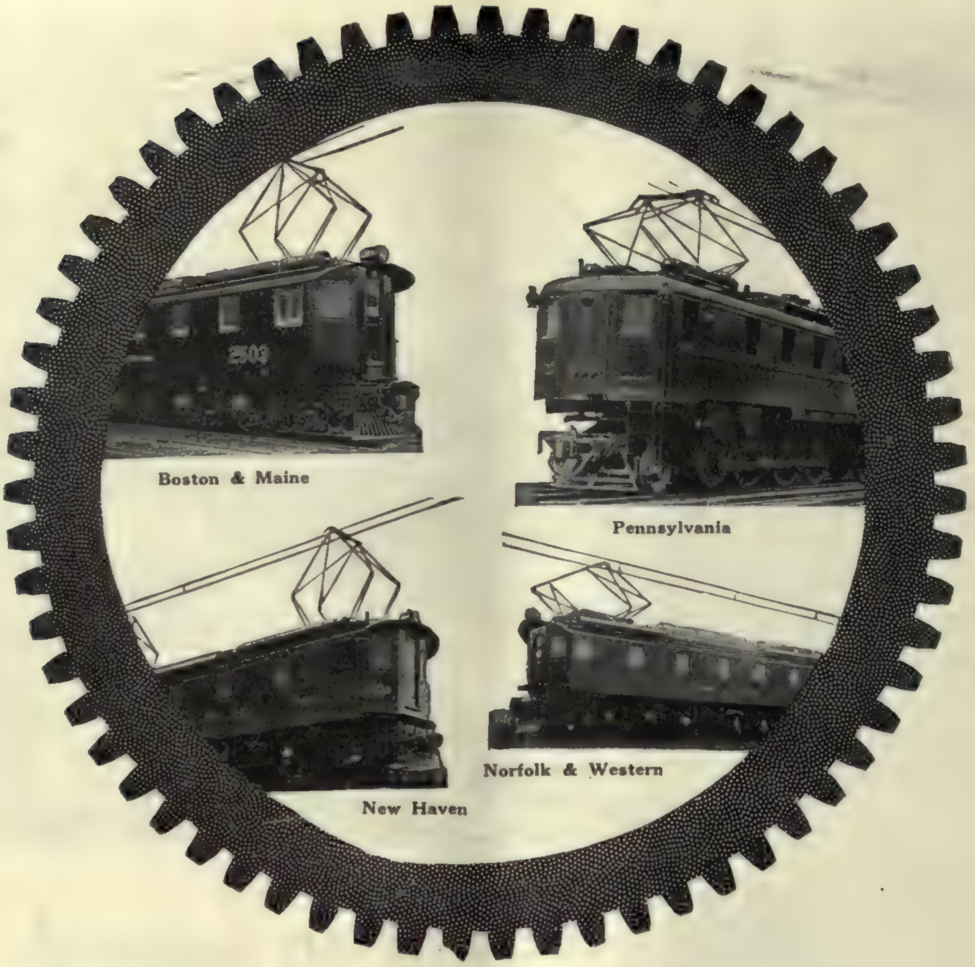

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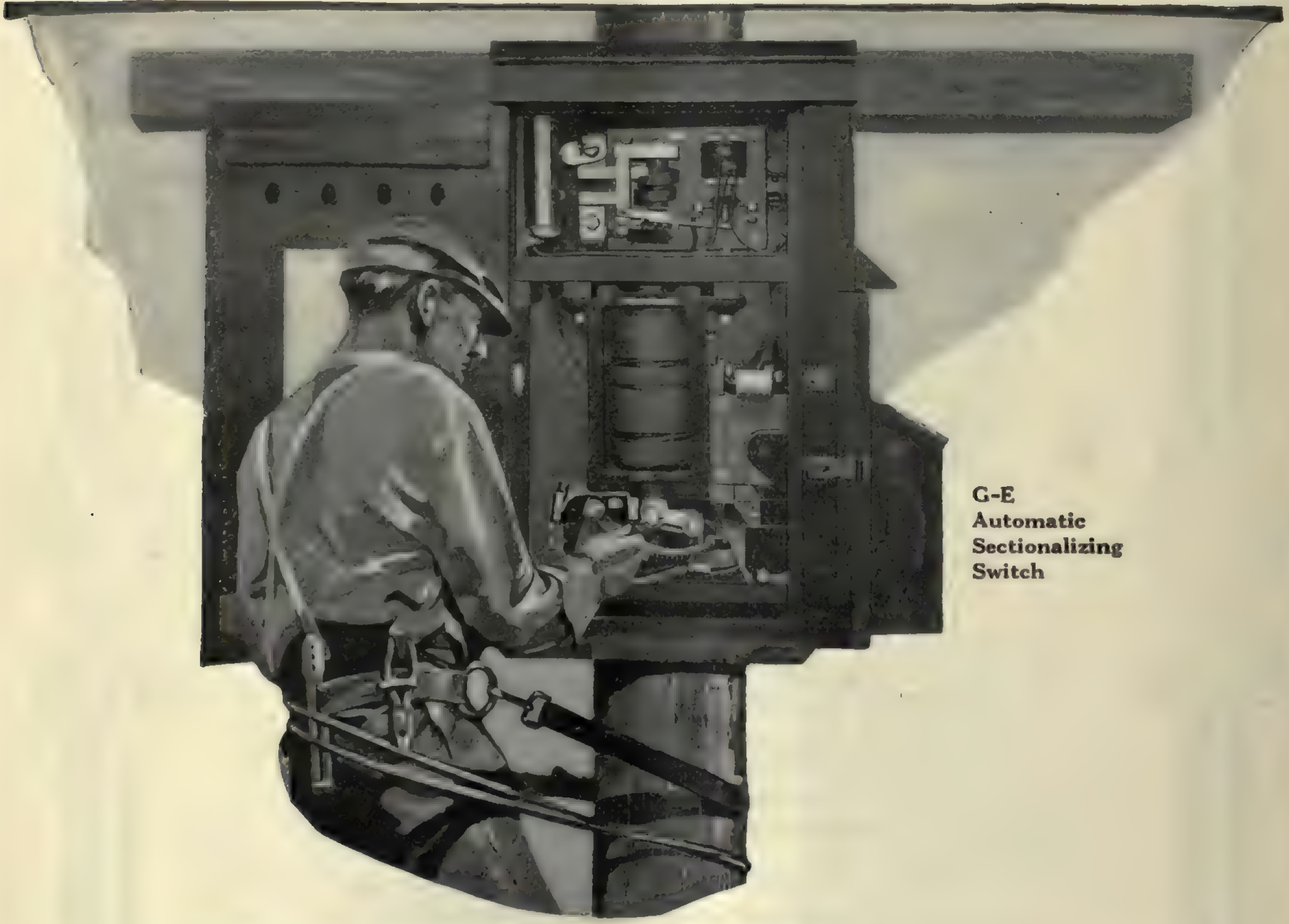

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# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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*Volume* 58 New York, Saturday, August 13, 1921 *Number* 7

## Progress in the Accident Situation

WHILE one often hears that there has been a great increase in the number of electric railway accidents because of the increase in automobiles and the many reckless automobile drivers, there is cheer in the study of accidents in Chicago which appears elsewhere in this issue. There it is shown that while the number of accidents is increasing substantially, the number of accidents per 100 automobiles registered and per 100,000 street car-miles operated is showing a healthy decrease. In other words, the effort that is being expended so generally to prevent accidents is really bearing some fruit. Automobile drivers and motormen are evidently becoming more careful, or perhaps more experienced in anticipating trouble and thus avoiding it.

The great need in furthering this showing seems to be a better, more readily usable system of filing accident report data both by railway companies and by the courts, the enforcement of the laws to the limit against those few careless or reckless drivers for whose transgressions everyone must suffer, and vigorous steps to protect the interests of the general public in the use of the streets and highways. The record system for electric railways suggested by R. F. Kelker, Jr., in the article referred to, appears to be a very effective way of handling this detail and is worthy of special study. Anything that can be done to aid in visualizing the accident problems and in analyzing causes, should receive immediate consideration. The plan proposed not only does these things, but it involves practically no expense—which is an especial appeal in these times.

## City Railways as Carload Freight Distributers

CITY railways have often been proposed as distributers of freight over the areas which they reach. But such propositions have usually included only l.c.l. or package freight, the railway taking the place of the present trucking concerns to a certain extent. Or, if carload freight was meant, it was assumed that the consignee would have to pay the local railway a switching and delivery charge in addition to the trunk-line charge.

That there are possibilities beyond this, which may be of real value to electric railways, is at least deducible from some decisions of the Interstate Commerce Commission affecting the Kansas City Railways. An article in this issue relates the history of a freight service development there and how the commission has finally granted to consignees on this particular branch of the Kansas City Railways the same freight rate that applies to the trunk-line delivery district. The significance of an extension of this policy, for which this case may be a satisfactory precedent, is very real. If consignees located at any point on the city railway are granted the same carload freight rates as those in the trunk-line switching district, the local railway would soon become an enlarged terminal railway for all carload freight distribution. From a civic standpoint, the development of business centers on land less expensive than that adjoining railroad sidings would be valuable. Congestion of freight traffic would be reduced and deliveries expedited. The local railway could make its track and power investment work during present lean hours.

While there are many other problems than the legal and rate problems to consider and solve before any such development may take place, yet the possible significance of this western precedent should be carefully studied. If it means more business at a profit for electric railways, it should be followed up.

## A Reduction in Coal Prices Would Help Business Revival

COAL being one of the important raw materials that go into the manufacture of transportation, electric railway officials may well concern themselves with the possibilities of reducing this fundamental expenditure, to keep pace with the healthy readjustments taking place in the expenditure for railway labor. They have this direct interest in a lowering of coal prices and also an interest in it indirectly for the reason that a substantial reduction in coal prices would be a strong influence toward the revival of business generally, which means an improvement of the market for transportation.

It is quite broadly felt that a reduction in freight and passenger rates on the steam roads would tend strongly to stimulate business. Such a reduction would be much more readily possible if a substantial decrease in the cost of coal to the trunk lines themselves could be effected. Such a reduction would be doubly effective. With a cut of 25 cents per ton to the railroad, its transportation cost and therefore charge could be reduced and thus the ultimate consumer benefit to an extent of possibly 40 to 45 cents per ton.

The whole country is interested in why reductions are not made and the outstanding reasons seem to be: the high labor cost in the mines, manipulation of the market and speculation by coal dealers and operators, too high margins of profit all around, inclusion in the price of overhead costs on undeveloped holdings, high freight rates, etc.

Some definite evidence of the effect of miners' wages on the price of coal is afforded by the following cost figures taken from a mine owned by a large traction company. In 1917, this company engaged a mine operator on the basis of a mining cost of 90 cents a ton with a bonus of one-half any saving under this figure. Without any charge for depletion, bond interest, sinking fund, etc., the pure production cost for April, 1921, was $1.95 per ton, for May $2.28, for June $2.07, and it has averaged $2 a ton for some time past. This is the direct result of high wages and decreased efficiency of the men, for the traction company buys through no middle man and thus all other factors entering into the ordinary purchase of coal, such as mentioned above, are eliminated. Nor can the high cost be attributed to low production, for this is about constant.

The United Mine Workers are operating on the high scale established by federal arbitration and are strongly opposing any attempt to lower the rates, even arrogantly claiming that no reduction will be accepted at the expiration of the present contract on April 1, 1922. Of course it would be unjust to attempt to take the desired reduction in coal cost entirely out of labor. All these other factors bearing on the price should be carefully considered also. But it would seem practical for the United States Department of Commerce, in its efforts to restore business to normal, to take a deep interest in all the factors of the present coal prices, with a view to exerting its influence along sound lines toward a reduction in the cost of this basic material to all industries. If, among other things, a wage reduction in the mines should be forthcoming, as seems likely, there is precedent for bringing it about in the action of the Railroad Labor Board which recently reduced the wages of railroad employees from the level established by governmental agency.

It should be made clear that the public utilities in urging governmental efforts directed toward reduction in the price of coal are not urging regulation either of the coal industry or of coal prices. A regulated industry itself, the public utility industry does not recommend price regulation as an aid to a healthy business condition. But if the government, in its work of aiding industry, can do anything of a helpful nature along the line of reducing costs, it should have encouragement and assistance.

## Constructive Leadership as Well as Regulation

AN EXAMPLE of the opportunity of commissions to assume constructive leadership, and not merely to regulate, is afforded by the present Connecticut developments. This is one of the most interesting and important situations in the railway field today in the problem of articulating the railway and the bus in the transportation business, or of finding which the people want and which can do certain kinds of work the better. These columns have already carried comment on the clear definition of a common carrier which has come from the court procedure; and also of the position of the railway upon whom the burden of making good or going broke is squarely placed. Litigation is now proceeding in both state and federal courts, with the really final verdict probably in the hands of the people.

But it is probably not appreciated by the railway industry, by the bus interests nor by the public to what extent they are all indebted to the Connecticut commission, and largely to its chairman, Richard T. Higgins, for the constructive nature of the developments that are taking place. It has done much to make effective in Connecticut the recommendations of the Federal Electric Railways Commission. The entire legislative accomplishment along railway and bus lines was the result of its analysis and recommendation. The situation created is not merely one of eliminating bus operation from the railway area. That may be one immediate move, but the broader purpose has been to establish the existing agency, the trolley, on a legitimate basis as regards taxes, paving, fare provisions, etc., and to regulate competing agencies so that the railway may prove its ability to serve the public and the public may decide if it really wants the railway or the bus. Variables have been removed as far as possible. The bus has been recognized as necessary in certain places. It is now up to the railway.

While the Connecticut commission was once criticised for entering the field of management in a fare adjustment, it should be pointed out that that error was soon rectified and that the present work of the commission, is even more constructive than mere regulation. It is creative and in the interests of the best public policy. The story is not yet closed in Connecticut—it is a long one, but one can be sure that the commission under its present leadership will play an important and useful part in the solution of one of the vexing problems of the local transportation business today.

## Reorganization Plans Are Along Right Lines

AS A RESULT of the work of the special reorganization committee of the American Electric Railway Association, the executive committee has made some constructive recommendations to the membership of that body. These are reviewed on another page of this issue, and copies of the complete report of the executive committee will be mailed from the secretary's office as soon as they can be printed. They are to be acted upon by the association at the annual convention in October.

For the best interests of the association and of the industry, the members should make a real study of these recommendations. It should be noted particularly that the committee provides that at this year's convention consideration of amendments to the constitution will not be limited to the exact wording proposed by the executive committee. Modification may be made and new amendments introduced. What is desired is the real expression of the majority of the membership. These facts make it doubly important that the members study these recommendations, not only to examine what the executive committee has recommended but also what it has not recommended.

Every change which the executive committee recommends is constructive and should be adopted. Prominent ones are membership definitions, organization and operation of the executive committee, improvement of election procedure, stimulation of committee activity and creation of the separate office of treasurer, and making him a member of the executive committee. It is significant that provision has been made for admitting trackless transportation companies to membership. This is no surrender to the "jitney." It is the best step toward a solution of the place of the bus in American urban and interurban transportation.

Perhaps the most important change of all, one upon which President Gadsden has laid stress, is the requirement that the executive committee meet monthly and really manage the affairs of the association. That it has not been done in the past is no reason that it cannot be done in the future. It is done in most other associations and societies—in all of them which really accomplish anything of value, it appears. A meeting of the executive committee of the association on a regular day each month should be as much a part of the duty of a man accepting the office as is any one of his regular corporate or operating duties. The provision that executive committee members may be represented by personal proxies—a practice already existing, as a matter of fact—should assure good attendance. An assurance of greater continuity in policy in managing the association is contained in the provision for three year terms for the manufacturer and operator members at large with one-third elected each year. This is a healthy move.

Another move that is very good is the provision for pre-election nominations. This is regarded by some as the most valuable result of the whole work. Its advantage is apparent.

Committee activity has always been recognized as a large element in the useful life of the association. The provision for the six standing committees and for periodical committee reports to the executive committee should add vitality to this work and should assist in keeping the executive committee in closer active touch with the association's affairs.

The executive committee policies formally adopted, aside from constitutional and by-law provisions, should also be welcome. Among these are: Small committees with a definite plan for continuity of membership and therefore activity; co-operation with educational institutions; geographical distribution of committee meetings and of representation on committees (this latter has been done, but it has not been a stated policy); and active co-operation with sectional associations and official representation at their meetings.

*Aera's* policy, particularly with reference to co-operation with the technical press and to avoiding duplication, was brought up, but no formal recommendation was made. President Gadsden's statement, however, that it would be put up to Mr. Welsh to avoid duplication is a step in the right direction. Such a plan if part of the permanent policy of the association would help to co-ordinate all of the energies in the industry.

## The Old Order Changes Slowly

IT IS perhaps not unlikely that there will be as much discussion on what the executive committee did not do as on what it did do. By this is meant its lack of action on admitting municipally owned railways and its rejection of the reorganization committee's recommendations regarding vice-presidents and past-presidents.

The executive committee seemed to feel that the practice of having its potential presidential nominees in training should be continued as at present. As stated in the report of the reorganization committee, its purpose, in revising the set-up of vice-presidents, was to make automatic the operation of the resolution adopted last October which said:

> that in view of the great changes which, from year to year and almost from month to month, mark the critical period through which our industry is passing, it shall be regarded as the fixed policy of the association that, in the selection of all its officers, the association will be guided by the requirements at the time, unaffected by the choice of previous years.

Of course the reorganization committee's method of four vice-presidents, two elected each year for two-year terms, is not the only one. Other ways have been suggested. One is that the association elect five of fifteen directors each year for three-year terms and empower these directors to elect the officers from their own membership, or not, as they deemed best. These directors, the officers, the affiliated association presidents and the two junior past-presidents of the American Electric Railway Association would constitute the executive committee. It will be recalled that Mr. Shannahan some years ago headed a Transportation and Traffic Association committee which recommended the election of only one vice-president by each of the affiliated associations so that there should not be a succession extending over three or four years in line for the presidency of these associations. The fact that all of these suggestions were made is indicative of a certain feeling that the present system has weaknesses which should be corrected. There are arguments on both sides. But the association should not, at a time when reorganization for the greatest effectiveness is under way, let the present system continue without full discussion and assurance that it is the best.

The question of service of past-presidents on the executive committee is a similar but somewhat different one. Some have said it is irksome; it has, of course, always been recognized that their advice was valuable. But even if nominally they have no vote, past-presidents who attend executive committee meetings regularly are certain to exercise great influence in its deliberations. The reorganization committee's recommendation of having only the two junior past-presidents as members of the executive committee, and these with a vote, was made with the apparent belief that the responsibility for management should be squarely placed on men elected to the executive committee for definite terms. This practice is followed by the N. E. L. A., A. I. E. E. and other organizations closely allied with the electric railway industry. After a specified term of active office in those societies even the past presidents return to the ranks.

On the question of admission of municipally owned railways, there is divergence of opinion also. As on the two previous questions, where there is divergence it is easier to let present rules apply. But again it is known that many association members are in favor of admitting municipal railways as members. This question was treated editorially in these columns on July 16.

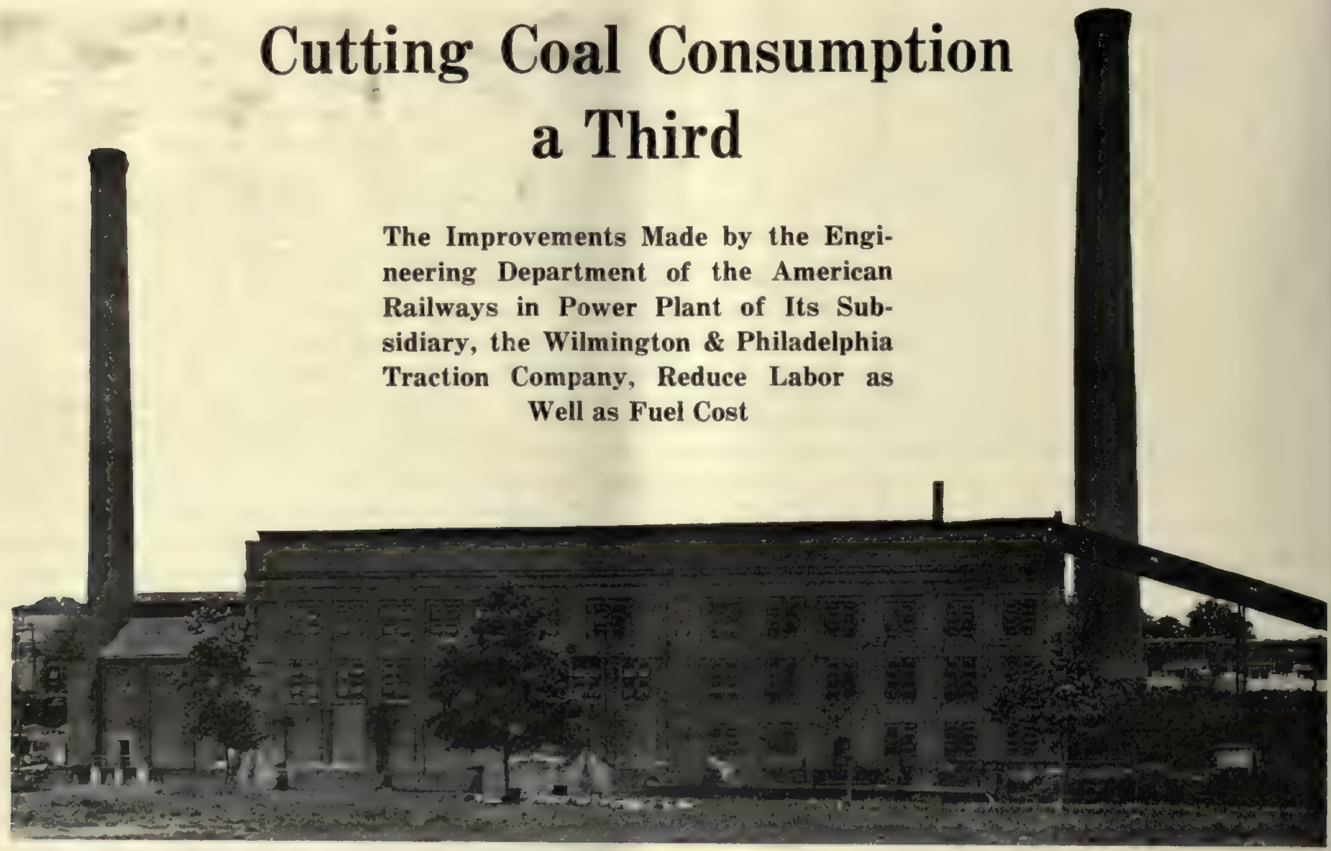
## Discussion by Membership Is What Is Now Wanted

THIS extended discussion of the situation is not to impress upon the industry the individual views of the editors of this paper, but to help bring the matter squarely before the membership so that there will be full and free discussion. In all associations, and this is no exception, there is the frequent accusation that policies are "cooked up" in the East and all that the membership can do is to "O.K." or reject. Certainly this is not now so in the American Electric Railway Association as regards the present matter. The door is wide open, the report is now public and open for discussion, and is to be acted on in open meeting and not by ballot. Free discussion is invited by the executive committee.

The ELECTRIC RAILWAY JOURNAL is glad to open its columns and invites a free and full discussion of this report and recommended action. Such discussion is needed to assure intelligent consideration and action at Atlantic City in October. The association is showing new signs of life, and no mistake should be made in recasting its organization and method of operation.

# Cutting Coal Consumption a Third

**The Improvements Made by the Engineering Department of the American Railways in Power Plant of Its Subsidiary, the Wilmington & Philadelphia Traction Company, Reduce Labor as Well as Fuel Cost**



REMODELED POWER PLANT WILMINGTON & PHILADELPHIA TRACTION COMPANY—NEW SECTION AND NEW CHIMNEY AT RIGHT

AT WILMINGTON, DEL., is located the power plant of the Wilmington & Philadelphia Traction Company, which furnishes power for the local railway, light and industrial power requirements. Since 1916 this property has been under the control of the American Railways, the headquarters of which are at Philadelphia. This plant was built in stages, the most recent large improvement in facilities having been the construction of the present main plant under the direction of J. G. White & Company in 1911. The demand on the plant has increased to such an extent by the time that the American Railways took over the property in 1916 an increase in capacity was immediately planned. Even before that year extensions had been inaugurated under the direction of the White company.

Without going into the history of the local power system in detail, it may be said that originally the plant consisted of three direct-current engine-driven units to which were added a 500-kw. and a 1,500-kw. Allis-Chalmers turbine generator units. These were supplemented before the present management took charge by a 4,400-kw. General Electric turbine unit. The plant also comprised, in a separate building, a complete equipment of boilers and two 500-kw. and one 1,000-kw. turbo-generators, inherited from another power enterprise. This is now known as plant No. 2. The machinery had been badly handled so that this plant was of little service in taking care of the growing power demand. It is now used for emergencies only, the turbine room doing duty as a machine shop.

Auxiliary machines in the main plant comprised a 1,000-kw. rotary converter, a 500-kw. motor-generator set for power purposes and two 250-kw. motor-generator sets used as feeder boosters.

At the outbreak of the great war the company had to take care of the enormously increased demand for power only the assorted equipment listed above, part of which was in bad repair. As soon as possible a 7,500-kw. General Electric turbine unit was added, but wartime industries overloaded the plant seriously. To add to the difficulty, the 4,400-kw. generator burned out, requiring rewinding of both stator and field. The blading and diaphragms of the turbine were also damaged. The first stage had to be rebladed and three new diaphragms were required. Opportunity was taken to improve the ventilating system of this unit by changes in the foundation, allowing the incoming air to enter from outside the building instead of as before from the hot pump pit below. This change also facilitated the installation of an air washer in the air intake.

The original two Allis-Chalmers turbines were also rebuilt and a new system of steam piping for them was installed.

### GENERAL REHABILITATION UNDERTAKEN

The demand for power continued to increase to such an extent that in 1917 plans were made for the installation of a 12,500-kva. Westinghouse turbine-generator unit. This led to a study of the plant as a whole and an extensive program of changes, now practically complete, was laid out. The result has been that the coal consumption of the plant has been reduced nearly 1 lb. per kilowatt-hour, or from about 3.1 to 2.1 lb. The operating cost in labor has also been reduced about 40 per cent. The capacity of the plant has been more than doubled, last year's output having been more than 70,000,000 kw.-hr. The saving in fuel over what otherwise would have been consumed is not less than $150,000 and that in labor $30,000 per annum.

The new turbine unit is a three-phase, 60-cycle, 1,800-r.p.m. machine. The voltage generated is 11,000, this being the only 11,000-volt machine in the plant. The best efficiency of the unit is at about 10,000 kva. or 8,000 kw., at which load the steam consumption is 13.3 lb. per kilowatt-hour, with 150 deg. superheat, 195 lb. throttle pressure and 28 in. vacuum, referred to a 30-in. barometer.

The installation of the unit presented some difficulty as the depth of the basement in the building was only 10 ft. below the engine room floor. This space was also partly occupied by two old engine foundations which had to be removed. A depth of 22 ft. was necessary for the condenser and pumps.

The old engine foundation, which rested on solid rock of a very hard kind, had to be blasted out with dynamite. In this blasting there was considerable danger to the adjacent units, which were kept in continuous operation. Twelve feet of rock had to be removed, and the foundations of the building and of the other generating units had to be underpinned before foundation work for the new unit could be commenced.

### FLEXIBLE AIR-WASHING AND COOLING SYSTEM

The generator of the new unit is equipped with an air-washing and cooling system with a capacity of 35,000 cu.ft. per minute. This was so installed that the air can be taken either from outside or inside the building and it can be delivered either out of doors or indoors. This makes it possible to accommodate the ventilation to the climatic conditions.

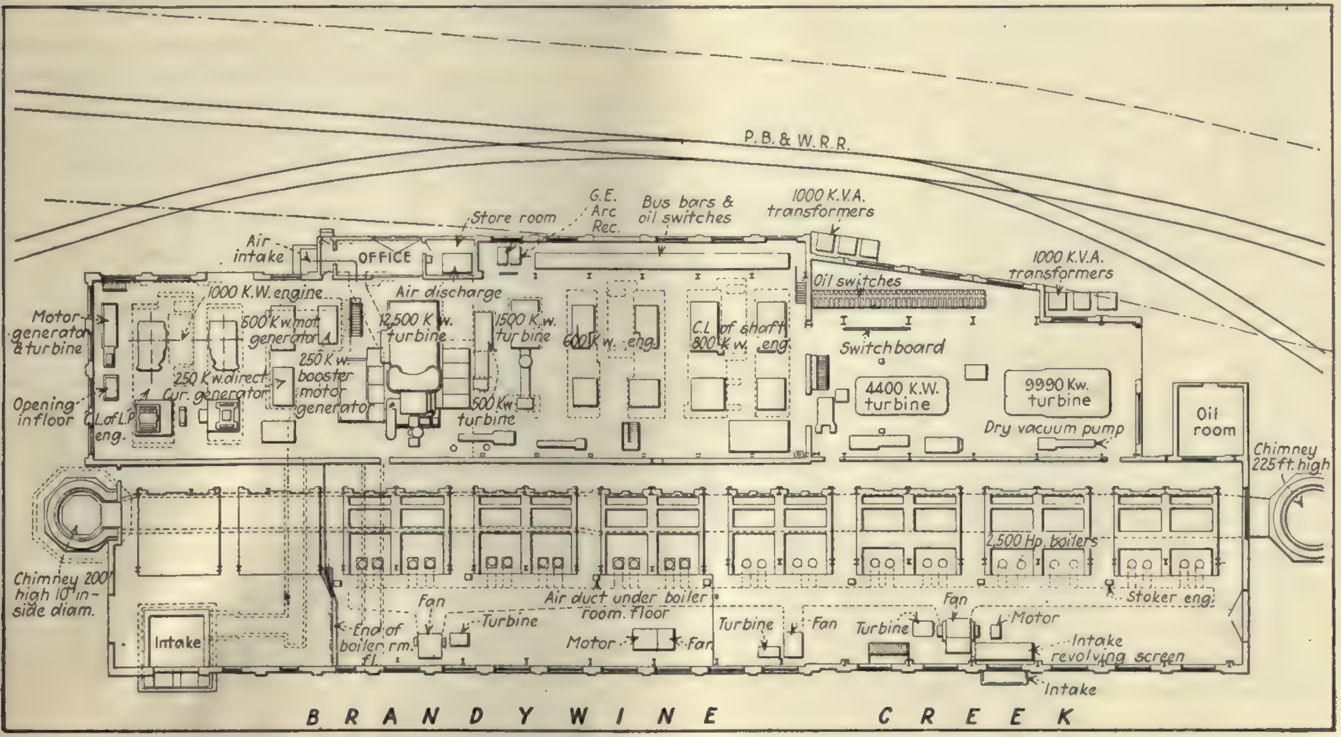
Unfortunately the space available for the new unit was not what might have been desired so that it was difficult to accommodate the auxiliaries in making the layout. For example, the air-washing and ventilating system required more space than was available above ground. It was necessary therefore so to design the generator foundation as to provide two compartments, one for air inlet and the other for outlet. This part of the foundation was carried down 8 ft. below the first basement floor, and underneath this floor two concrete air ducts were built, each 5 ft. x 7 ft. One is connecting the air washer with the air inlet chamber in the generator foundation and the other connecting the air outlet chamber with the distribution stack.

LOOKING DOWN THE BOILER-ROOM FIRING AISLE

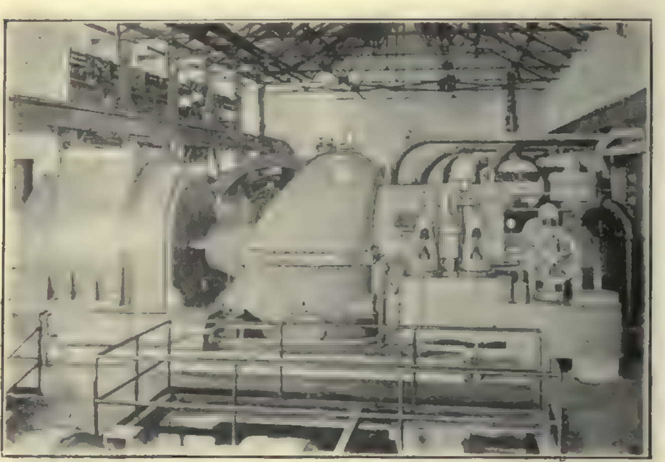
Any one not familiar with this installation would have difficulty in locating the air-washing system of the unit, for it is not visible at the floor level. This arrangement has the advantage of leaving all floor spaces in the basement free and unobstructed, thus facilitating the work of the operating crew.

The air circuit is by-passed around the washer so that the latter can be repaired without interfering with the generating unit. In this case the air passes through two rows of fine mesh screen before entering the generator. The outdoor intake for the air is through louvers and brass wire screens of 24 mesh, No. 30 gage.

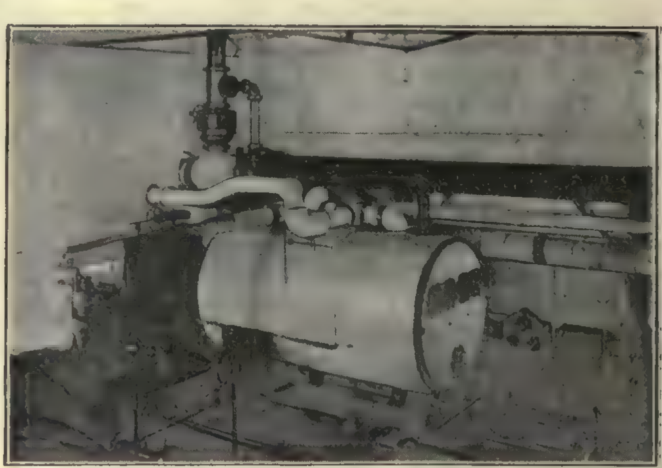
The turbine is direct-connected through a 6-ft. x 12-ft. copper expansion joint to a 17,500-sq.ft. surface condenser. The condenser auxiliaries comprise two



GENERAL LAYOUT OF THE POWER HOUSE



New 12,500-Kw. Turbine Unit



Looking Down on Feed-Water Heater of 20,000 Hp. Capacity

20,000-gal. (per minute) centrifugal circulating pumps for cooling water, two 350-gal. centrifugal hot-well pumps and two dry-vacuum pumps, the auxiliaries thus being in duplicate, only one set of pumps being in use at a time. One each of the circulating pumps and of the hot-well pumps is motor-driven, while the rest are steam-driven. The motor-driven pumps were installed both to insure flexibility and to assist in maintaining high point efficiency through control of the heat balance.

The condenser is also connected to a 30-in. Cochrane multiport free-exhaust valve. This allows the exhaust from the turbine to pass automatically to the atmosphere in case the vacuum is lost or in case it is necessary to run the turbine under high pressure.

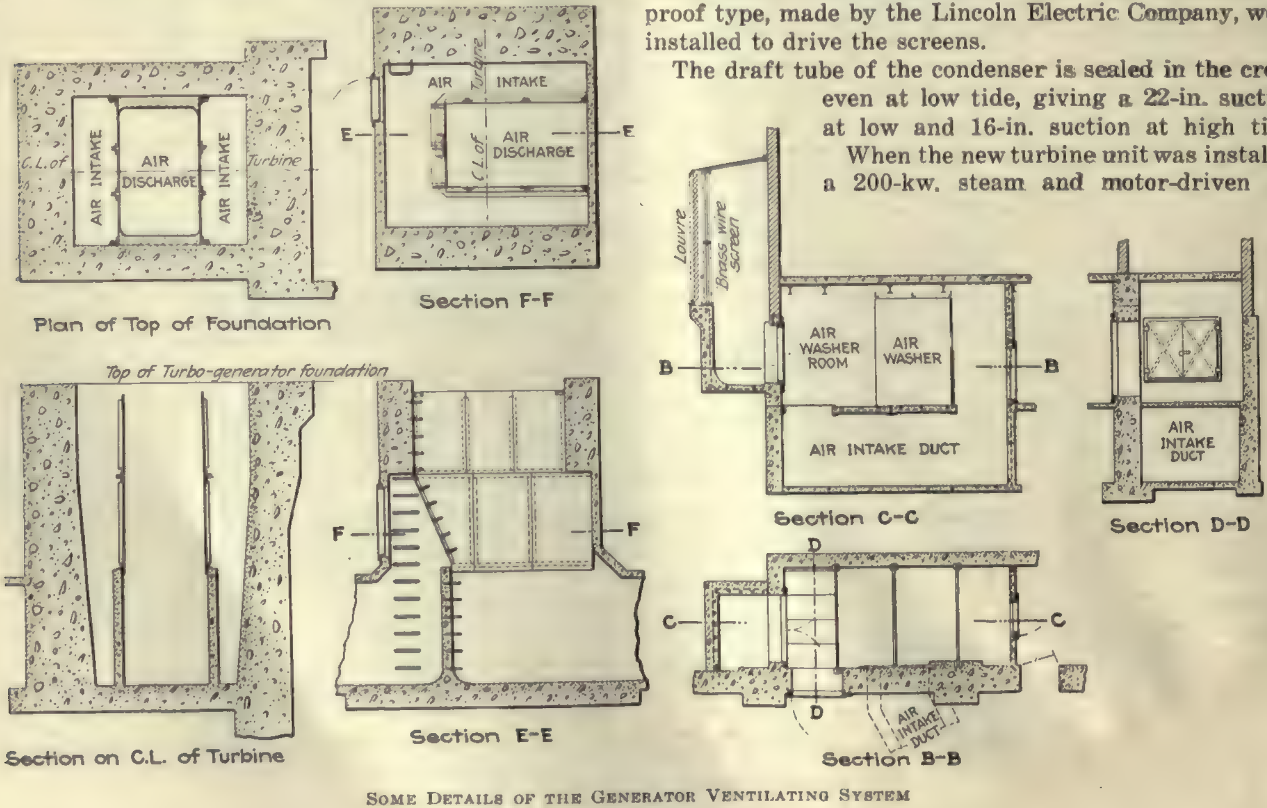
Steam is furnished to the turbine through a 12-in. pipe which connects with the main header in the boiler room. In this 12-in. pipe, close to the turbine, is a 54-in. Sweet receiver separator. The separator is intended merely to safeguard the turbine in case the boilers should foam or too high a water level be carried in the boilers. Mention has already been made of trouble in this plant through the carrying over of water, and it is desired to prevent a repetition of this.

The general placing of this plant is unfortunate in that the boiler room, instead of the turbine room, lies along the source of circulating water, Brandywine Creek. This makes it necessary to carry the circulating water under the boiler-room floor. The new unit requires an entirely new layout of circulating water system. An intake pit was blasted from the solid rock from the creek to a point inside the boiler-room basement, to a depth to bring its bottom level with the bottom of the creek. A grating of flat steel bars was placed over the inlet to the pit.

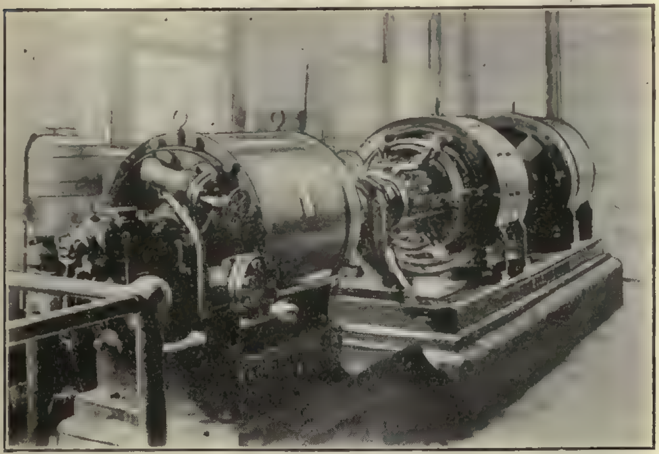
In the pit inside the building two motor-operated revolving water screens, made by the Chain Belt Engineering Company, were installed to prevent the ingress of leaves, etc., to the 30-in. suction pipe which leads from this pit to the condenser circulating pump. As the vicinity of this intake is damp, motors of the waterproof type, made by the Lincoln Electric Company, were installed to drive the screens.

The draft tube of the condenser is sealed in the creek even at low tide, giving a 22-in. suction at low and 16-in. suction at high tide.

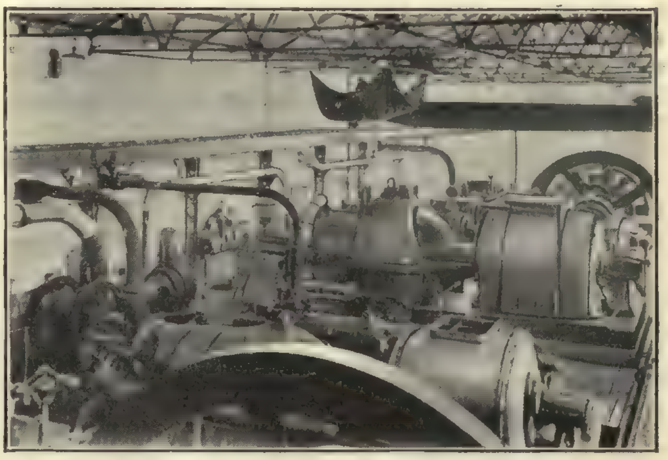
When the new turbine unit was installed a 200-kw. steam and motor-driven ex-



Some Details of the Generator Ventilating System



THE TURBINE AND MOTOR-DRIVEN EXCITER UNIT



GENERAL VIEW IN THE TURBINE ROOM

citer was also put in, its capacity being sufficient for the entire load of the station as it exists today. At one end of the unit is a 300-hp. Kerr turbine, in the middle is a 1,600-amp., 120-volt Burke generator, and at the other end is a Burke motor of 300-hp. capacity. The speed of the unit is 1,200 r.p.m. The motor is of the slip-ring, three-phase, 60-cycle, 2,300-volt type.

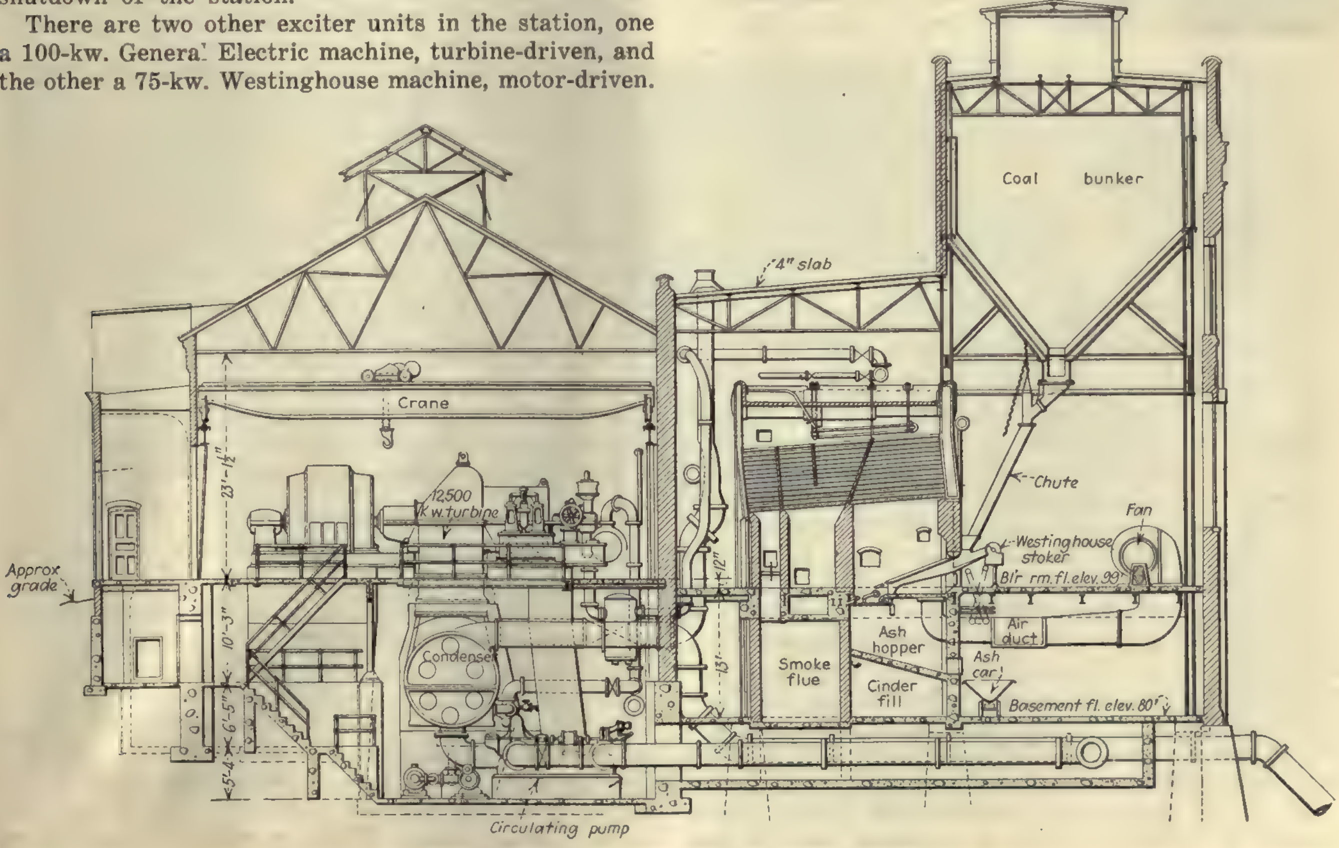
This type of exciter unit was selected for two purposes, first, to assist in maintaining the heat balance of the plant, and, second, to provide the maximum of reliability. The turbine is provided with a governor so designed that it can be set by hand either to increase or to decrease the speed of the turbine, thus relieving the motor of all or part of the load or throwing the entire load on the motor as desired to maintain the proper temperature in the feed-water heater. Further, if the motor should fail or trip out for some reason the turbine will automatically take the load that is being carried by the generator, thereby preventing a shutdown of the station.

There are two other exciter units in the station, one a 100-kw. General Electric machine, turbine-driven, and the other a 75-kw. Westinghouse machine, motor-driven. All of the exciters are controlled through a separate switchboard on the main floor through solenoid-operated, direct-current circuit breakers operated from the main switchboard.

### IMPROVEMENTS IN THE BOILER EQUIPMENT

The boiler equipment had to be augmented, of course, to make up for the increase in turbine capacity. The boiler room was extended 100 ft. and new overhead concrete-steel bunkers, coal conveyors, etc., were installed. Six new 550-hp. Edgemoor water-tube boilers were added, these being provided with Westinghouse underfeed stokers. The boiler-room improvements also included the necessary stoker drive, ash pockets, bunker spouts, etc. The earlier boilers numbered six of 500-hp. and two of 550-hp. capacity, all Edgemoor and of the four-pass type, making fourteen boilers in all at the present time.

Incidentally a new main header was installed for



CROSS SECTION OF WEST END OF POWER HOUSE several of the old boilers. The larger of these boilers were equipped with Westinghouse stokers and the smaller with Taylor stokers, with the exception of two boilers on which the original Wetzel stokers, designed for natural draft, have been allowed to remain.

The increased capacity of boilers involved a corresponding increase in boiler feed pumps, formerly three in number. It was deemed most economical to put in two new turbine-driven feed pumps, each having a capacity of 850 gal. per minute, sufficient for the entire station. They will produce a working pressure of 250 lb. per square inch, or an excess of 50 lb. over the boiler pressure. The pumps were made by the Cameron Steam Pump Company, and the turbines used for driving them are of the latest Westinghouse type. New feed-water mains were provided for these pumps, and these were connected at intervals to the old feed line, giving a flexible feed system. Automatic valves are installed also to connect the feed line with the city water system in emergency and to insure water supply for the cooling of bearings.

THIS TANK ELIMINATES THE WATER BILL

### DETAILS OF STOKER-BLOWER UNITS

There are four fans in the boiler room to supply air to the stokers. Like the other auxiliaries, these are designed to assist in maintaining the station heat balance. There are two fans of 50,000 cu.ft. capacity each. At present these are motor-driven, but later they will be equipped with turbines also. The newer units are respectively of 65,000 and 85,000 cu.ft. capacity and are driven both by turbines and slip-ring induction motors. The connection to the turbines, which are of the high-speed type, is through reduction gears, while the motors are direct connected.

The blower units give a working pressure of 6 in. (of water), and they insure a high degree of flexibility in operation.

### AUXILIARIES IN THE BOILER ROOM

The engineering department of the American Railways believes in the use of the latest devices for improving boiler-room operation. To this end the boilers were all equipped with Diamond soot blowers. Stetz continuous feed-water regulators and a balanced-draft system installed by the Engineering Company. The feed-water regulator operates independently of the regular feed-water line.

A new Cochrane feed-water heater, of the open type, and having a capacity of 20,000 boiler-hp., was provided to take the exhaust steam from all auxiliaries and heat the water for the entire plant. Space being at a premium for this unit, it had to be set up on a pedestal behind one of the old engine units. It thus takes practically no floor space.

All of the boilers are equipped with Foster superheaters to provide a working superheat of 150 deg. Each boiler is furnished with a Precision "three-in-one" gage to permit supervision of the draft conditions.

For the new boilers a brick and concrete smoke flue was built connecting with a new 14-ft. 200-ft. radial brick chimney. The new flue is an extension of the old steel smoke flue leading to the old radial brick chimney. This arrangement, together with the necessary flue dampers, gives a flexible arrangement of flue and stack connections.

An improved ash-handling outfit was another feature of the rehabilitation. An overhead storage bin was erected in the yard and furnished with a Beaumont ash hoist. A track runs along behind the boiler ash hoppers, from which the ashes are collected in small cars. These are hauled by electric tractors to the hoist. From the storage bin the ashes are distributed by electric cars belonging to the company and designed especially for this work.

### A NOVEL COAL-HANDLING OUTFIT

Now a word as to coal storage. When the American Railways took charge of this plant little space was available for this purpose. A new piece of ground was promptly purchased and graded to the same level as the old yard. On the enlarged space a drag-scraper coal-handling system, designed by the R. H. Beaumont Company, has recently been installed. This system consists essentially of a cable or set of cables, driven by a reversible, motor-operated drum and carrying special scrapers which are used to drag the coal as desired. The driving mechanism is mounted in an operating tower from which all parts of the yard are visible, and the cable loops around pulleys attached to substantial posts set around the edge of the yard. The stakes or posts at Wilmington consist of 12-in. Bethlehem section steel beams set deep in rock and concrete. With the equipment installed, two scrapers can be used, but one is sufficient at present. One man can handle the work. The same equipment reclaims the coal from storage, delivering it to the crusher through a conveyor. The company now has storage capacity for from 10,000 to 15,000 tons of coal and can distribute easily 60 tons per hour with the drag-scraper outfit. In a pinch 50 tons can be distributed in thirty minutes and the pile can be spread evenly to a depth of 20 ft.

The power plant is located alongside the main line of the Pennsylvania Railroad, from which a siding runs into the yard. In regular operation some coal is dumped from the cars direct to the crusher, but most of it goes into storage.

From the crusher the coal goes to an elevator, which delivers it to an inclined belt conveyor, and thence to a traveling dumping carriage, which distributes it throughout the bunker in the boiler house. This bunker is 200 ft. long and has a capacity of 2,000 tons.

### ELIMINATING THE WATER BILL

The company formerly purchased most of the boiler feed water from the city system, the bills amounting to as much as $1,200 per month. To save this expense a 75,000-gal. overhead water-storage tank has been installed in the yard and piping laid to permit this to be filled direct from Brandywine Creek. Water is pumped into this tank by a motor-driven centrifugal pump, which is controlled by a float in the tank, insuring a predetermined level. A steam-driven pump is also connected in the pipe line as a reserve. The tank was built by the Chicago Bridge & Iron Works. Two sand filters have been installed in the water system, with provision for introducing alum later if this is found necessary.

Arrangements have recently been perfected also by which the 500-kw. Allis-Chalmers unit in the power plant can be used as a house-service unit. This has been furnished with step-down transformers to reduce the three-phase voltage from 2,300 to 440, from which power is drawn for the plant auxiliaries.

This turbine will be operated at high pressure, the exhaust steam being used in the feed-water heater.

### CONCLUSION

This article does not purport to be a complete list of the changes which have been made in the Wilmington plant. Others, including the placing of the main switchboard in a gallery instead of upon the main floor, are contributing to the general saving. Much credit is due the mechanical engineer of the American Railways, A. Kuylenstjerna, working with the general manager, H. J. Crowley, for enlarging and rehabilitating this plant under trying conditions, without interfering with service and with a gratifying financial return for the investment made. These changes have enabled the superintendent of power generation in charge of the station, George T. Bromley, to obtain more efficient operation.

## Des Moines Loses Car Service

**All Kinds of Improvised Vehicles Used—Merchants' Association Takes Action to Relieve Situation—Labor Union Interests Seeking Restoration of Service**

DES MOINES now occupies the unique if unenviable position of being the largest city in the United States without street car service.

The shutdown of traction facilities in Des Moines which came at midnight, Aug. 3, following an order to that end by Judge Martin J. Wade of the Federal Court, is a direct result of the lackadaisical attitude maintained by the City Council and citizens of Des Moines toward the transportation problems of the city during the past year.

As a result of the shutdown, transportation has been in a condition of chaos ever since the morning of Thursday, Aug. 4. Buses which for the past few months have been petted and pampered by the City Council have utterly failed to meet the situation, and as this article is written the business interests of the city have evidently finally become aroused and are working desperately to find a solution.

Business men are being backed in their fight by the employees' union, which has the support of union labor in general, in a demand to the City Council that the buses be ruled from the streets and some plan developed which will permit of a resumption of street car service. While the business men and labor leaders may not agree as to details they are unanimous that service must be restored.

The first tangible ray of hope for a settlement came as a result of a meeting Saturday morning between officials of the Des Moines City Railway and of the Retail Merchants Association. While both parties to the conference decline to give definite details of its outcome it is said that F. C. Chambers, general manager of the Des Moines City Railway, was commissioned go to Chicago to present to the owners and bondholders the counter proposal agreed upon. Information as to the plan is not authoritative but is said to be based upon a plan for a 7-cent fare with the buses ruled from the streets, the owners or bondholders to advance the $300,000 necessary to meet the overdue interest, and to repurchase equipment which will restore service to a 125 car basis. The main stumbling block of the plan is to the doubt as to whether the $300,000 can be secured. Earlier in the week A. W. Harris advised two of the Des Moines daily newspapers that he would not put any more money into the Des Moines property until he was given fair treatment by Des Moines.

If the financial obstacle can be overcome it is probable

BUSES ATTEMPTING TO HAUL THE CROWDS

EVEN THE POLICE PATROL WAGONS WERE USED

that Judge Wade will be asked to order a resumption of service and the General Electric Company asked to replace the substation equipment which was removed a few weeks ago and which caused the service cut of approximately 50 per cent.

While the retail merchants and company officials were in conference a delegation of union labor men representing practically every union in the city waited on the City Council and demanded that the Council take immediate steps to end the difficulties. No words were minced by the labor leaders, and at the end of the meeting members of the Council agreed that they were willing to vote for an anti-bus ordinance if fares could be reduced to 7 cents. Mayor Barton agreed to get in immediate touch with Corporation Council Miller who is out of the city on his vacation and ask him to return to the city and prepare a new franchise proposal. Members of the Council agreed to hold a Sunday session if Judge Miller could return to the city by that time.

### BUSES DON'T GIVE ENOUGH SERVICE

That the buses have failed miserably since the beginning to meet the situation is proved by a vote taken by one of the daily papers late last week as to the preference of citizens as between street cars and buses. In a two days' poll 1,056 people voted for the return of street cars while 202 preferred buses.

Saturday the bus operators had seventy-two buses in service and made the claim that on Friday they had hauled 55,000 people. Additional buses were shipped to the city daily for temporary service, but the bus owners association refused to make preparations for a permanent service by the installation of satisfactory buses unless they were given a guarantee by the City Council of at least a year's service on carline streets. Of the seventy-two buses in service the latter end of last week about half were of a fairly satisfactory kind. The remainder were makeshift, many of them being home-made bodies on trucks. So far, the City Council has refused to make any arrangements for a permanent grant and has turned a deaf ear to proposals of at least three men who claimed to represent Eastern capital which would take over the transportation of the city if a grant was given to them.

As yet the shutdown of the city plant has not stopped service of the Inter Urban Railway which is owned by the same interests as the Des Moines City Railway. The main power plant is still being operated to furnish power for the interurban lines although no definite statement has been made as to how long this will continue. If the Inter Urban was forced to abandon service it would cause serious embarrassment to the work of dismantling Camp Dodge, as well as interfering with the annual encampment of the national guard of Iowa. It would also cause serious difficulties for the Des Moines Electric Company which secures its coal supples from mines located on the interurban.

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The comparative cost for a million tractive-miles between the former steam service and the electric service now maintained on the Norfolk & Western Railway, as given recently in the *Railway Electrical Engineer*, shows that electrification is responsible for a 12½ per cent saving. The cost per million tractive-miles of steam operation was $29.90, while that for electric was $26.20. In this comparison all costs entering into operation, as well as interest and depreciation, have been taken into account.

# North Shore Makes Safety Record

**By Active Attention to Safety Methods the Road Has Greatly Decreased Its Accident Record While Doubling Its Car Mileage**

IN AN article in the *National Safety News* for June, on the safety work of the Chicago, North Shore & Milwaukee Railroad of which Britton I. Budd is president, it is pointed out that while this company has increased the number of passengers carried 100 per cent, the car mileage 100 per cent, the passenger revenue 300 per cent and the freight revenue 700 per cent in the last five years, it has cut down its fatal accidents 77 per cent and reduced the total accident costs to 1.18 per cent of its gross revenue. The underlying reason for this showing is attributed mainly to the attitude of the president in heading an extensive safety organization, the functioning of which was described in this paper, issue of Feb. 22, 1919, p. 359. The men all through the organization have been encouraged to make suggestions that would improve the safety of the road. Furthermore, the company has taken every possible means of preventing accidents, most of which have been treated in this journal in prior issues.

One interesting detail mentioned in the article referred to is the practice of the motormen, upon seeing a trespasser on the track, to throw a sealed letter out to him which reads as follows:

> Don't you realize there is serious danger to anyone walking these tracks, owing to the fact that our cars are run at high speed? If the motorman should fail to see you in bad weather, or while rounding a curve or for some other reason, you would be placed in imminent danger of being killed or injured. It is our desire to cultivate the safety work on this road to a point where every accident of an unavoidable character will be eliminated, and we hope that you will at once discontinue walking on these tracks so that the chances of your being injured or killed will be done away with.

Another interesting point related is the practice of the company in maintaining instruction signs for the motormen at numerous points along the right-of-way. Every approach to a curve, every highway crossing, every railroad crossing, every station and the speed at which the train should pass such points, is called to the motormen's attention 1,000 ft. away from that point. The signs read thus: "Curve 100 ft., 15 miles"; "Railroad crossing 1,500 ft., 20 miles." There is thus no chance for the motorman to forget danger points or what speed to operate in passing them.

The North Shore road is also extending its safety work to the communities through which it operates. It is organizing civic safety associations in each city and is sending its own woman lecturer into the public schools to give talks on safety to the children. Last year this woman made 667 talks in seventy-seven schools and thus reached 25,000 children along the company's right-of-way. Furthermore, the company is placing in the hands of the principal of every school in the territory served, a book entitled "Methods for Instruction in Accident Prevention for Use in Public Schools." The extent to which the co-operation of the public and community leaders in this work is being secured was well demonstrated by a recent meeting at which the Waukegan Civic Safety Association was organized, where the principal of the local high school, the editor of the local newspaper, the judge of the local court, the mayor of Waukegan and the mayor of North Chicago were present and pledged the fullest co-operation to the officers of the road.

# Measuring Service to the Public

### The Riding Public Is Interested in Three Things: Car Frequency, Speed and Fare —How the Status of the Winnipeg Railway Was Set Forth in These Particulars

BY C. H. D. DAHL, B. A.
Statistician for the Winnipeg Electric Railway

THERE are in the main just three things about a street railway system which interest the ordinary car rider. One is how long he must wait for a car on which to ride, the second is how much he must pay in order to ride, and thirdly, he is interested in the speed with which the cars travel. Oh, there are other factors which are important, such as the courtesy displayed by the conductor when making change; the general appearance of the car, its sanitary condition, its riding qualities and so on, and a number of other things perhaps—but these miscellaneous factors occupy only the periphery of the rider's interest.

#### SIGNIFICANCE OF CAR-MILES PER MILE OF SINGLE TRACK

The headway of cars is best gaged by the car-miles per mile of single track within a specified time. Usually a calendar year is employed for the time factor. The headway is inversely proportional to the car-miles per mile of single track per year. The accompanying table illustrates this. It is assumed that service is furnished by the cars for an average of eighteen hours per day.

TABLE I—SHOWING INVERSE RELATION BETWEEN CAR-MILES PER MILE OF SINGLE TRACK PER YEAR AND AVERAGE HEADWAY OR INTERVAL BETWEEN CARS

| Car-Miles per Mile of Single Track per Year | Average Headway or Interval Between Cars |
|---|---|
| 98,550 | 4 minutes |
| 78,840 | 5 minutes |
| 65,700 | 6 minutes |
| 56,310 | 7 minutes |
| 49,250 | 8 minutes |
| 43,800 | 9 minutes |
| 39,420 | 10 minutes |

#### AVERAGE FARE AND SPEED

As a measure of the cost per ride there can, of course, be no better measure than the fare paid. The use of different fares by different classes of passengers, or in different periods of the same year as a result of changes in fares, or differences based on quantities of tickets purchased make it desirable to employ the average fare for the period as a gage of the ride cost. The average fare is obtained by dividing the total passenger revenue by the number of revenue passengers.

Perhaps nothing is quite so testing of the car rider's patience as finding himself on a car which stops on a passing track for any length of time. Delays in loading or unloading passengers are also annoying, for while the rider is willing to concede some time for this purpose, in fact his primary interest is wrapt up in himself—it may be that he is tardy for tea, for the theater, or some other appointment; possibly he is merely a victim of the contagious anxiety displayed by fellow riders to get somewhere quickly—at any rate, delays annoy him. It the jitney possesses any popularity as a means of urban transportation, then the speed with which it gets passengers to their destinations is very largely responsible for this popularity. Lack of equivalent speed in electric railway systems serves as a subsidy for the jitney.

#### USE OF ARRAYED DATA IN MAKING COMPARISONS

A. W. McLimont, vice-president of the Winnipeg Electric Railway, desired to place before the public of Winnipeg the facts with reference to the quality of service and fares of the street railway. To do this, comparisons of car-miles per mile of single track per year and average fares were made with nineteen selected electric railway systems of United States cities having populations and operating conditions somewhat comparable with that of Winnipeg. A table was prepared in which the cities were arrayed according to size from the largest down—the names of the cities occupying the middle column of a three-column table. The first column contained the car-miles per mile of single track for all cities, and the average fares were similarly arranged in the third column. In order to identify the car-mile of single track and average fare belonging to any particular system, a small exponent or index figure was placed over each, corresponding to the index down immediately above the name of the city in which the system was located. To bring special attention to the status of the Winnipeg system, heavy arrows were drawn from the name of the city to car-miles per mile of single track as shown for Winnipeg in the first column of the table and from the name of the city to the average fare for Winnipeg as shown in the third column.

This table appeared in June 15 issue of the *Winnipeg Electric Railway Public Service News*, a four-page paper published semi-monthly for the purpose of informing the public of the company's problems and fostering more amicable relations between the company and its patrons.

Table II on page 240 is a copy of the table in the company's paper excepting that instead of showing the names of the cities in which the transportation systems compared are located these are represented by the various letters of the alphabet. L represents Winnipeg, Canada. In the table as printed the words "high in service" were printed opposite the figures giving car-miles per mile of track for Winnipeg and the words "low in fare" opposite the figure showing the municipal fare. The figures in the two columns representing Winnipeg were connected with "L" by two arrows. All data were taken from traffic ratios received from the American Electric Railway Association and are therefore actual.

Table II affords a good means of conveying to the public, information concerning the kind of service rendered and the fare situation of a particular system compared with other systems, but it is just a step further to combine the car-miles per mile of single-track factor with the fare and speed factors and arrive at what may be termed an efficiency index.

TABLE II—SERVICE AND FARE STATISTICS FOR 1920 OF WINNIPEG AND OF NINETEEN UNITED STATES CITIES HAVING POPULATION OVER 100,000 BUT UNDER 800,000

| Car Miles per Mile of Single Track | Cities Arranged in Order of Population | Average Fare (Cents) |
|---|---|---|
| 98,380$^{1}$ | *A*$^{1}$ | 7.5$^{16}$ |
| 93,650$^{9}$ | *B*$^{2}$ | 7.3$^{5}$ |
| **67,701**$^{12}$ | *C*$^{3}$ | 7.2$^{1}$ |
| 84,440$^{3}$ | *D*$^{4}$ | 7.2$^{2}$ |
| 78,550$^{5}$ | *E*$^{5}$ | 7.0$^{7}$ |
| 73,910$^{6}$ | *F*$^{6}$ | 6.9$^{9}$ |
| 72,170$^{14}$ | *G*$^{7}$ | 6.4$^{3}$ |
| 71,230$^{2}$ | *H*$^{8}$ | 6.2$^{13}$ |
| 70,570$^{7}$ | *I*$^{9}$ | 6.2$^{14}$ |
| 64,470$^{4}$ | *J*$^{10}$ | 6.2$^{10}$ |
| 60,480$^{13}$ | *K*$^{11}$ | 6.1$^{18}$ |
| 59,990$^{17}$ | **L**$^{12}$ | 6.0$^{8}$ |
| 58,700$^{11}$ | *M*$^{13}$ | 6.0$^{19}$ |
| 54,030$^{18}$ | *N*$^{14}$ | 5.8$^{15}$ |
| 47,690$^{20}$ | *O*$^{15}$ | **5.6**$^{12}$ |
| 46,400$^{8}$ | *P*$^{16}$ | 5.6$^{11}$ |
| 43,320$^{10}$ | *Q*$^{17}$ | 5.4$^{17}$ |
| 42,910$^{19}$ | *R*$^{18}$ | 5.0$^{6}$ |
| 36,600$^{15}$ | *S*$^{19}$ | 5.0$^{4}$ |
| 24,630$^{15}$ | *T*$^{20}$ | 5.0$^{20}$ |
| 63,491 | Average | 6.2 |

The efficiency index is the product of three percentages namely, (1) the percentage which the car-miles per mile of single track of a particular system is to a given base; (2) the percentage which the average fare for this particular system is to a given basic fare, and (3) the percentage which the speed bears to a basic speed.

For convenience in computing the first-named percentage 100,000 car-miles per mile of single track is adopted as a base. Another merit of this base is that it is large enough to avoid rating practically any system over 100 per cent in point of service as measured by car-miles per mile of single track.

The second or fare percentage is reached by assuming 5 cents as the basic fare. Few if any electric railways will be rated over 100 per cent on this basis now. This basic fare is divided by whatever fare the percentage is desired for.

The third or speed percentage is arrived at by assuming 10 m.p.h. as base. This makes it simply necessary to manipulate the decimal point to get the percentage for any particular system, granted of course that the speed is given. Table III shows the efficiency indices for the twenty systems dealt with.

There are a number of advantages connected with the efficiency index as described in this article but perhaps the most important are as follows:

TABLE III—EFFICIENCY INDICES OF TWENTY ELECTRIC RAILWAY SYSTEMS FOR YEAR ENDED DEC. 31, 1920

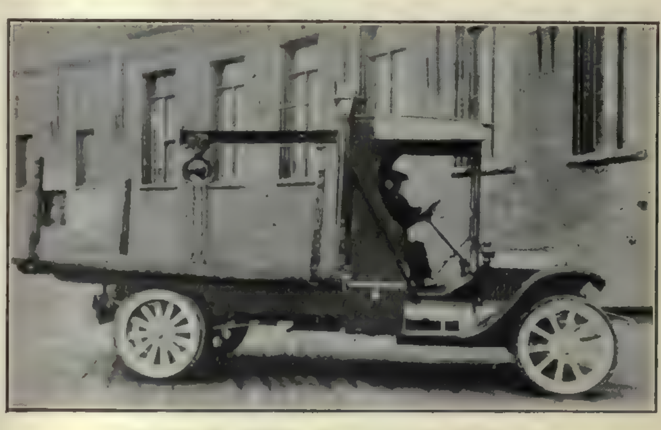
| Location | | Car Miles per Mile of Single Track Percentage (*x*) | Average Fare Percentage (*y*) | Speed Percentage (*z*) | Efficiency Index Per Cent (*xyz*) |
|---|---|---|---|---|---|
| 1. | L | 87.7 | 89.3 | 89.5 | 70.0 |
| 2. | D | 64.5 | 100.0 | 101.8 | 65.6 |
| 3. | F | 73.9 | 100.0 | 85.8 | 63.5 |
| 4. | A | 98.4 | 69.5 | 92.8 | 63.2 |
| 5. | C | 84.8 | 78.1 | 88.0 | 58.0 |
| 6. | I | 93.6 | 72.5 | 84.6 | 57.5 |
| 7. | N | 72.1 | 80.5 | 92.9 | 53.8 |
| 8. | E | 78.6 | 68.4 | 91.7 | 49.4 |
| 9. | Q | 60.0 | 92.5 | 88.1 | 49.0 |
| 10. | K | 58.7 | 89.3 | 91.6 | 48.0 |
| 11. | G | 70.6 | 71.5 | 92.8 | 46.9 |
| 12. | B | 71.2 | 69.5 | 92.9 | 46.0 |
| 13. | M | 60.5 | 80.5 | 93.4 | 45.5 |
| 14. | T | 47.7 | 100.0 | 88.4 | 42.0 |
| 15. | R | 54.0 | 82.0 | 86.2 | 38.2 |
| 16. | H | 46.4 | 83.3 | 90.6 | 35.1 |
| 17. | J | 43.3 | 80.5 | 89.9 | 31.3 |
| 18. | S | 42.9 | 83.3 | 82.7 | 29.5 |
| 19. | P | 36.6 | 66.7 | 90.5 | 22.1 |
| 20. | O | 24.6 | 87.3 | 87.3 | 18.5 |
| Average (simple) | | 63.4 | 80.5 | 90.1 | 46.0 |

1. The index is based on absolute units so that it may be used to compare different systems for the same period or the same system for different periods.
2. The index is a composite measure of the three factors concerning service which interest the car-rider, viz., headway, fare and speed.
3. The index is quite sensitive to differences in the measure of any one factor of service. This is evident by observing the range of the indices for the twenty systems considered in Table III.

It must not be inferred that a low efficiency index stamps a system as inefficient. There may be local conditions in the form of city by-laws, topography, or traffic characteristics which influence the operation of the cars. The speed factor is especially susceptible in these regards. But in a broad and general way the use of the efficiency index is a simple yet most effective means of measuring the service rendered for the riding public by a street railway system.

## Truck Replaces Supply Car

THE New York State Railways recently remodeled a 2-ton White truck, purchased in 1917, for use as a supply truck. As will be observed in the accompanying illustration, a frame built up of bar steel has been bolted to the body just behind the driver's compartment and is held vertically by two bars, one on each side, extending to the car chassis. An I-beam is hinged to the supporting frame, thus allowing heavy pieces of material and equipment to be picked up from the ground beside the truck and loaded by means of the chain hoist. This supply truck replaces a double-truck, two-man-operated supply car. The substitution of this means for transporting supplies has cut the cost of distributing materials and collecting scrap about 40 per cent.



REMODELED TRUCK FOR HANDLING SUPPLIES

The New York State Railways already has a simple and effective plan for dispatching trucks and work trains, so that the adaptation of an auto truck for the purpose previously mentioned involved no changes in the general system of distributing supplies. This well-worked-out method of recording truck and work train movements was the subject of a paper in the issue of this paper for Jan. 5, 1918.

The American Institute of Electrical Engineers has submitted its standards (1921 edition) to the American Engineering Standards Committee for approval as an American standard. The standards submitted represent the latest revision of the A. I. E. E. standardization rules, revised during 1919 and 1920.

THE ABANDONED HORSE-DRAWN VEHICLE

THIS TRAILMOBILE IS USED TO CARRY HOSE BRIDGES

# Hose Bridges Carried in Trailer

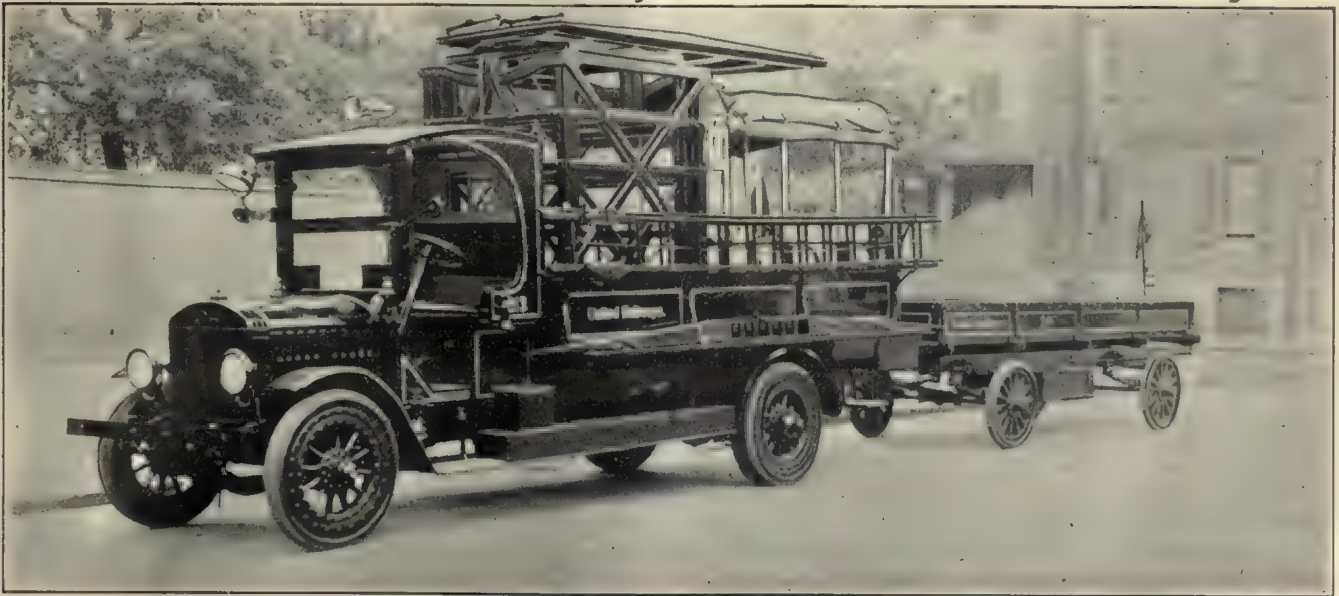
### By Substituting a Trailmobile for a Horse-Drawn Vehicle The Baltimore Property Is Saving More Than $1,000 a Year

BY ADRIAN HUGHES, JR.
Superintendent of Power United Railways & Electric Company of Baltimore

THE employment of trailers in connection with broadening the fields of usefulness of motor trucks for many and divers purposes has for so long been the rule rather than the exception that it is difficult to find a new adaptation which would in itself be unique. It is probable, however, that all the possibilities of the trailer have not yet been exhausted or fully appreciated by many motor vehicle users.

The United Railways & Electric Company of Baltimore, for instance, has recently put in service a trailer for the purpose which it might be possible to term a new and unique application of this very useful motor vehicle appendage. The company was faced with the problem of replacing the heavy horse-drawn wagon in the trouble department for carrying hose bridges which are used to bridge over lines of fire hose to prevent blockades of traffic in the vicinity of a fire. All other horse-drawn trouble department equipment had been replaced with motor vehicles, and it was very undesirable and uneconomical to have to maintain two horses in the main trouble station merely for the occasional requirement of hose bridges, but the large investment and subsequent maintenance charges necessary for a motor truck to serve the purpose could not be justified, since the unit would be standing idle most of the time, inasmuch as fires requiring use of hose bridges are rather infrequent. Nevertheless it was absolutely essential to eliminate the horses and yet have a vehicle which would always be immediately available solely for the purpose of carrying the hose jumpers.

The answer of course was the trailer and, after the problem was carefully investigated, a 1½-ton "trailmobile" chassis was purchased and a body designed and built, having suitable compartments for the hose bridges, the spreaders, lanterns and other accessories. Each of the seven trouble trucks in the department is equipped with couplers so that the trailer may be attached to any of them when the hose bridges are needed. The draw-bar of the trailer is so arranged that it steers the front wheels, causing the trailer to follow around turns in the tracks of the motor truck and thereby making it unnecessary for the driver to use extraordinary precautions in maneuvering. In fact, the driver can practically ignore the presence of the trailer in all operations except backing. The difference in size of the two vehicles, as shown by the illustrations, is very interesting. The abandoned horse-drawn wagon carried ten sets of hose bridges and


THE EMERGENCY MOTOR TRUCK CARRIES TWO HOSE BRIDGES AND THE TRAILER CARRIES EIGHT

the trailer carries eight sets. Each trouble truck is also equipped to carry two sets of hose bridges.

The results obtained have been very satisfactory. The bridges may now be transported when required with much greater dispatch than was formerly attainable with the heavier and slower horse-drawn wagon. Moreover, it is expected that the maintenance charges for the trailer will be practically negligible, especially as concerns the usually most costly item encountered in maintaining trucks, namely, the rubber tires, which, in the case of the trailer, are not subjected to tractive effort and therefore escape the severe wear that is naturally inherent with all forms of motor-driven vehicles. Furthermore, the substitution of the more modern method for carrying the hose bridges has released considerable valuable space formerly required for the horses and wagon at the Lombard Street trouble station, and the space is now available for more important purposes. The appreciable economy effected by the elimination of the horses for the comparatively infrequent service required is almost too apparent to warrant comment.

However, the following figures will indicate approximately the amount of the annual saving on the basis of an investment of $1,600 for the horse-drawn wagon and two horses and $1,200 for the trailer:

| | Horses and Wagon | Trailer |
|---|---|---|
| Investment | $1,600 | $1,200 |
| Annual fixed costs at 12 per cent | 192 | 144 |
| Annual operating and maintenance costs | 1,140 | 150 |
| Total annual costs | $1,332 | $294 |
| Saving | | $1,038 |

Thus a much more satisfactory and efficient vehicle has been provided to replace the horse-drawn vehicle, at about one-fourth the investment necessary for a motor vehicle, and at a saving sufficient to pay for the trailer in fourteen months.

There are many other purposes for which trailers could be used in electric railway work for carrying equipment which is not in constant use, such as devices for reeling and rereeling feeder and trolley wire, as well as derricks, gin poles and concrete mixers for use in connection with installation of poles, etc.

## Case Hardening—Core and Case

THERE seems to be a great difference of opinion in regard to the question of which is more important, the case or the core in case hardening steel material. In the case-hardened steel the seller usually dwells on the properties of the core, while the user seems to consider the case of more importance and the essential part. Dr. Aitchison, in a recent lecture, stated that both are of equal importance in the manufacture of case-hardened parts. The case should be hard but should also be tough, because to withstand abrasion or blows a material does not need to be intrinsically hard, but it must be durable and have a high value of yield point. The best test of the qualities of a case is the use of microscopic inspection to note the quality of free cementite, which tends to produce a brittle case. The core has a definite function to perform, it should be tough and should possess great strength because in manufacture of transportation equipment parts, lightness is an essential requirement. If the fracture appears to be gray and fibrous the article is regarded as sufficiently tough.

## A Community Freight Service

### Kansas City Railways Builds Local Freight Service and Interstate Commerce Commission Grants Terminal Rates to Patrons—Railway Now Has a Prospect of Making a Profit

AFTER operating a terminal freight line with electric locomotive for fourteen years under serious handicaps as to rates, the Kansas City Railways Company has been granted a readjustment under which both the railways company and the consignees will be able to proceed more profitably. Patience and persistence have won, and the railways company, which has doggedly continued its service because the service was needed, finds itself now in position to enter the period of radically increasing volume with a prospect of profit in this service. The readjustment consisted in the application by the Interstate Commerce Commission of the Kansas City, Mo., freight rates to Westport, Mo.

Westport is the title of a suburban community well within the city limits of Kansas City, Mo., served as to freight carriage by an electric line of the Kansas City Railways, cars being received by this company from the Missouri Pacific, the Frisco and the Kansas City Southern at Dodson, 8 miles south of the Westport station. Westport is the original settlement of Kansas City, Mo. It is on high ground 5 miles south of the Missouri river landing of those ancient days. In the old days a steam road with dummy engine equipment filled in a service to the Westport district, having its connections with the steam roads at Dodson and taking cars from the trains before these trains reached the union terminals. There has been no facility for transferring freight cars from the terminals to the Westport district otherwise than at Dodson.

In 1907 the Kansas City Railways (then the Metropolitan Street Railway) took over the dummy line and electrified it, maintaining and improving the freight terminals and incorporating the rail line with its passenger-carrying electric system. Passenger and freight cars use the same tracks for the 8 miles from Dodson to Westport, diverging at the edge of the terminal yards.

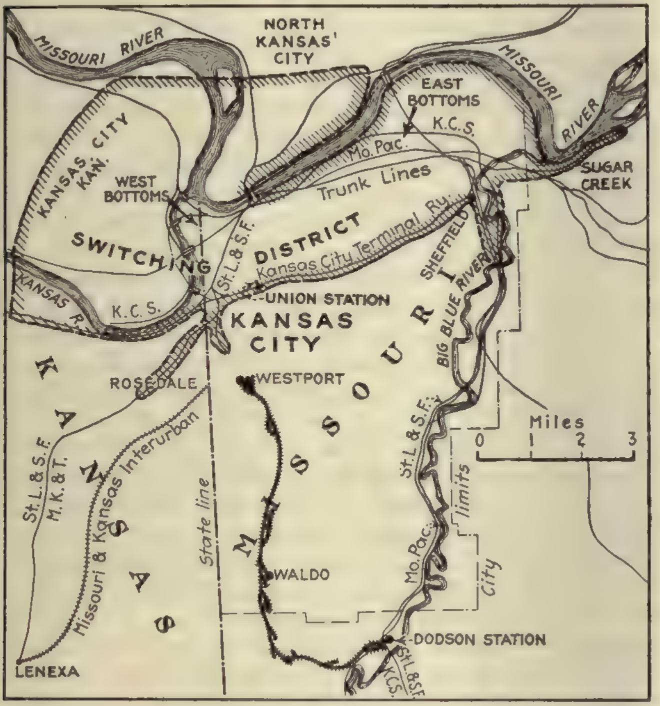
The company has, during the past year, been handling about fifteen freight cars a day over this line. This is considered an abnormally low level of business, and the average is expected to increase as business conditions improve.

The Country Club passenger line, with double-truck cars, has a three-minute headway in rush hours of morning and evening, during which periods freight cars are not run. The shortest headway throughout most of the day, excepting rush hours, is four minutes, and operation of the freight trains occurs even in the four-minute headway period. The only problem is one of power, the operation of freight trains interfering with schedules when passenger cars are under three-minute headway. The Country Club line is operated between Forty-third Street (Westport) and Sixty-third Street only. Between Sixty-third Street and Dodson, the southern terminus, passenger service is with one double-truck car making the round trip on thirty-minute schedule.

The convenience, even the necessity, of a freight terminal at Westport has been more and more emphasized every year. Within 2 miles of the Dodson line were the areas most rapidly developing as residence districts—one of these sections being nationally famous as the "Country Club District." Materials for residence construction and supplies, except for this freight line, would have to be hauled 5 to 10 miles up grade, sometimes even farther. The time element alone warranted attention to the Westport facilities, as every year was showing worse delays in passage of freight through the Kansas City terminals.

Through all these years, however, freight service into Westport over this line has been hampered by the rates. Dodson, 10 miles south of the Union Station at Kansas City, took the Kansas City rate on commodities from the south, and the local rate from Dodson to Westport was added for shipments into Westport.

For several years the Kansas City Railways received only a switching charge of $8 for handling the cars from Dodson to terminals. This was collected by the railways company from the consignee, who then could collect $4 of it back from the line haul road. On December 5, 1920, the charge was increased to $15 per car, still collected from the consignee, who still was able to collect $4 from the line haul road.



Map Showing "Dodson Line," Which Is the Basis of an Interesting Freight Rate Decision by the Interstate Commerce Commission

The Westport consignee therefore paid the Kansas City rate plus the net $11 of switching charge Dodson to Westport. A consignee who received commodities at the Kansas City freight terminals paid only the Kansas City rate and no switching charge (the charge being absorbed by the line haul road); the Westport consignee was therefore at a disadvantage of $11 per car. But despite this disparity, the industries grouped along the Dodson line persisted, and the railways company, despite its unprofitable operation, continued to give the communities the freight service, both interests being convinced that eventually their rights and the justice of the situation would be recognized.

The Interstate Commerce Commission, after continued hearings, issued an order, effective May 2, 1921, relieving the burden from the consignee and providing an adequate compensation to the railways company for its service. Under this order the freight rate to Kansas City, Mo., applies to Westport, Mo., on lumber and many other commodities, from many southern districts, including practically all points in Arkansas, Oklahoma, Louisiana and Texas, on the Missouri, Pacific, Kansas City Couthern, Frisco and connecting lines. This removes the differential and places upon the line haul roads delivering the cars at Dodson the absorption of the charge necessary to complete the entire transportation of the shipment to Westport via the Kansas City Railways—the same as to any industry within the Kansas City switching district.

The consignee, because of this readjustment, finds himself on a par as to charges with others of his industry in Kansas City and with a great advantage in the convenience of the delivery. The Dodson-Westport consignee finds his shipments close to his hand, the topography and conditions of the area permitting easy extension of tracks to yards or factories. These shipments avoid the occasional congestion and the regular delaying routine of the Kansas City switching district. It is estimated that by the changes just described from one day to a week are being saved by the consignee.

## Removal of Glue Stains

Casein and vegetable glues containing caustic soda produce stains on certain kinds of wood, notably the oaks, maple, cherry, elm, ash, birch and beech. Some glues stain the wood more than others, and those that contain the most alkali are likely to be most injurious. The staining is due to the action of the alkali in the glue on the tannins and other constituents of the wood, whereby a substance related to ink is formed. No means have yet been found of preventing this chemical action. Precautions can be taken, however, the Forest Products Laboratory, Madison, Wis., believes, which will keep the discoloration from the finished surfaces.

Most trouble experienced with glue stain in woodworking is caused by the penetration of the glue solution through thin face veneers. This seepage is very likely to occur if the veneer is less than 0.05 in. thick and somewhat porous. The consistency of a glue in part determines whether it will be squeezed through the wood or not. It is quite obvious that under similar conditions a thin glue will penetrate farther than a thick glue. For this reason the quantity of water that is added to a glue might be diminished and "fillers" added when staining is feared. The amount of pressure exerted by the panels in the press is also a factor, but it would not be advisable to reduce the pressure in order to check the flow of the glue.

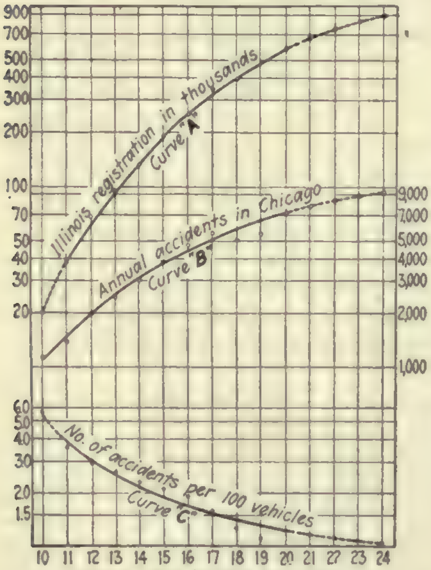
If a panel is dried promptly, the caustic soda solution will have difficulty in coming to the surface. Rapid drying can be brought about by removing the panels from the press as soon as it is safe to do so, and placing them on stickers. The amount of staining can also be decreased somewhat by placing a caul or some other flat object between adjacent panels in the press.

Casein and vegetable glue stains can be almost entirely removed by sponging the stained surface with an oxalic acid solution, prepared by dissolving 1 oz. of oxalic acid crystals in about 12 oz. of water. Still better results may sometimes be obtained by moistening the wood first with a sodium sulphite solution made up in the same concentration as the oxalic acid. In this way very stubborn stains can be almost obliterated.

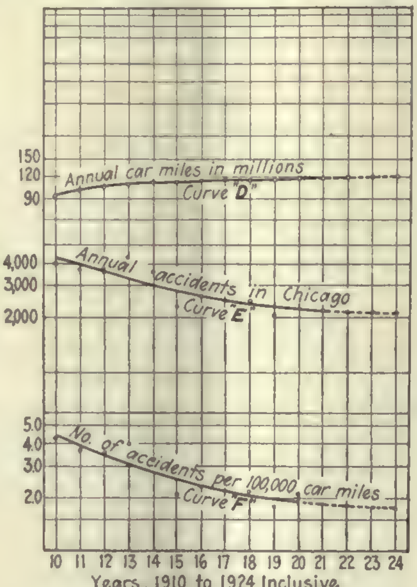
# Accident Record Shows Improvement

### A Study Made in Illinois Reveals That Safety-First Work Is Bearing Fruit—Greater Efficiency by Chauffeurs and Motormen Urged, Also Better Accident Record System

A MEASURE of cheer in the growing accident problems involving street cars and automobiles was brought out in a study of accident data in Chicago recently by R. F. Kelker Jr., engineer, Chicago. The results of this study are presented herewith in graphical form, from which it is seen that while the number of automobile accidents is greatly increasing, the number of street accidents per 100 motor vehicles is showing a very healthy decrease. Similarly, the number of accidents per 100,000 car-miles operated by the Chicago Surface Lines has shown a good decrease in the last ten years. As it was impossible to secure the number of automobiles used in Chicago alone, it was necessary to make use of the registration figures for the entire State of Illinois in making this comparison. From these curves it is seen that while the number of annual accidents reported by the Chicago police for automobiles increased from 1,130 in 1910 to 7,110 in 1920, the reported motor vehicle accidents per 100 registered vehicles decreased from 5.65 to 1.24, or a decrease in the ratio of 22 per cent. In 1910 the Chicago Surface Lines operated 92,809,508 car-miles and suffered a total of 3,969 accidents as reported by the Chicago police. In 1920 the number of car-miles operated was 117,118,072 and the number of accidents, 2,477, or a reduction in the ratio from 4.27 accidents per 100,000 car-miles in 1910 to 2.11 in 1920, or 50 per cent.



TREND OF ACCIDENTS TO MOTOR VEHICLES IN CHICAGO STREETS



TREND OF ACCIDENTS INVOLVING STREET CARS IN CHICAGO

These curves were plotted on logarithmic paper simply as a means of making them more compact. The purpose of the curve is mainly to show the trend and this is as well portrayed in a small space on this kind of paper as it is in a much larger space on regular co-ordinate paper.

Mr. Kelker attributed the improvement in connection with automobile accidents to the betterment in the mechanical design of the automobiles, to the greater skill on the part of drivers and to the increased alertness of pedestrians and drivers of horse-drawn vehicles. It is his view that the best means for securing a further reduction in these ratios is to raise the average of skill of motor drivers through the prompt prosecution of those drivers who by carelessness violate the law.

Mr. Kelker believes that the improvement shown in the number of accidents involving street cars is due to the greater alertness of pedestrians and patrons of the cars, to the replacement of horse-drawn vehicles by motor vehicles and the consequent improvement in uniformity of speed of all vehicles using the streets, and to better training and discipline of motormen. His view is that further reduction of this ratio can be secured only by special study to determine the location of dangerous places on the various lines, and by using accident data to forecast the probability of accidents so that the causes may be guarded against or eliminated.

## RECOMMENDATIONS FOR ACCIDENT PREVENTION

Mr. Kelker has for many years been closely connected with street railway operations in Chicago. He is of the opinion that the system of keeping accident records, outlined below, will greatly facilitate the study of accident conditions and therefore tend to reduce the number of accidents. In the main, two things are sought in the plan proposed: First so to visualize the accidents taking place to the man responsible that repeated accidents at any location will promptly be noted; and second, to make readily accessible the data on any class of accidents on any line.

To accomplish these things it is suggested that a large scale map of the car lines (about 3 in. to the mile) mounted on a soft pine board, be used for locating with colored pins the various accidents. The map should be divided into sections to show the various operating divisions and then subdivided on a co-ordinate system for purposes of reference and for use in filing reports. All accidents would be grouped according to class and colors assigned as follows:

| Group Letter | Description | Color |
|---|---|---|
| A | Alighting and boarding........ | Green |
| B | Collision with vehicles........ | Red |
| C | Struck by cars.......... ..... | White |
| D | Operating defects............ | Blue |
| E | Collision with cars........... | Yellow |
| M | All other accidents............ | Orange |

When an accident is reported, a pin of the proper color would be stuck in the map in the proper co-ordinate section. Besides the pins mentioned, which would have solid colors, there would be other pins with a black dot on the head to indicate accidents at any street intersection, the solid colors being used for those occurring at all other places.

Then the accident reports or the memoranda on any accident would carry the name of the line, the co-ordinates of the location on the map, and the group letter to determine the proper filing place. Thus the key for file of any record would be something like this: "Madison H4 B," Madison being the name of the line, H4 the map co-ordinates, and B the class of accident. All accident records would be filed first by line, then subdivided by location and further subdivided by class of accident. By this scheme the data for a study of a certain class of accidents on one line or for the whole system could be readily produced. It should be understood that in this scheme it is accidents and not claims that are being filed, for the latter would only encumber the file and be of little value in any study of the situation to reduce the number of accidents.

## New Processes for Treating Coal

### Dirty Coal an Economic Waste—High Cost of Coal Makes Processes Possible—Flotation and Gravity Utilized in Treatments—Oil Used as a Reagent in New Trent Process

WAR conditions forced every power producer to use any and all kinds of coal that he could get. But these same conditions caused a closer study of the economies of power production and plant operation to counteract rising costs of all sorts. It was soon generally recognized that it is a waste to have transportation facilities used to transport fuel that is dirty and high in ash content; to put dirty or high ash coal under boilers; and to fight clinkers and transport ash cars. But one good result of an economic situation of this character is that it usually produces remedies.

In the coal situation the first remedy was to wash out the dirt. This can be done very rapidly if the coal is large size but is difficult to accomplish with slack coal. One new process for treating coal, recently developed in Belgium, is called the Rheolaveur process, and is described by R. Nelson in the *Electrician* for July 8, 1921. A strong and steady flow of water forces the coal along a trough and the coal shale and dirt separate by stratification, the rate of flow and length of trough being made suitable for complete stratification. The dirt is drawn off at intervals through the insertion of cast-iron boxes which are equipped with hand valves for controlling an upward flow of water which prevents the coal coming off with the dirt. At the end of the trough the clean coal is delivered to hoppers. In washing nut coal only two boxes are necessary, the first to draw off most of the shale and the second to draw off the rest of the shale and some coal which is later reclaimed by rewashing. In washing small coal, four boxes and two troughs are necessary. The process claims low initial cost, low maintenance cost, easy control, simplicity of operating parts and economy of space.

### FLOTATION PROCESS

In the treatment of fine or slack coal, the newer processes use an adaptation of methods developed in the ore industry. One of these described by Mr. Nelson is independent of gravity. The coal to be treated is ground until it all passes a $\frac{1}{10}$-in. mesh screen. The coal is then mixed with three or four times its weight of water and a small quantity, 1 lb. per ton of coal, of some reagent such as oil or a coal tar product. The mixture is then agitated by a power mixer to produce a multitude of air bubbles. The coal attaches itself to these bubbles and floats to the top in the form of a thick layer of froth. The dirt and ash-forming material sinks to the bottom and is drawn off and rejected. Scrapers remove the froth and the coal is then dried.

The machine consists of from five to ten "mixing" boxes, each with a "froth" box. The material passes from mixer No. 1 to froth No. 1, to mixer No. 2 to froth No. 2, etc. A machine capable of dealing with 1,000 tons of coal a day is about 37 ft. x 16 ft. x 15 ft. in size. In a typical separation of Derbyshire slack the process reduced the ash from 29.5 per cent in the cinder fuel to 9.86 per cent in the cleaned coal.

### USE OF OIL AS REAGENT

The latest development in coal cleaning was brought about by the co-operation of the Bureau of Mines and the Trent Process Corporation of Washington, D. C., and is described in *Coal Age*, July 28, 1921. A mixture of pulverized coal and water is stirred with oil whose weight is about 30 per cent the weight of the fuel. Due to this agitation the coal particles form a pasty amalgam with the drops of oil which is heavier than water and sinks; the ash and non-combustible materials which have been separated by the pulverizing, remain in suspension in the water, are not affected by the oil, and may be drawn off. The coal amalgam is then treated to remove the water and then used as fuel either wet or in dry briquets. This process is new and is apparently very efficient for bituminous coals but has not as yet been developed on a commercial scale.

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## The Situation in the Petroleum Industry

THE rate of growth in the petroleum industry in recent years and the prospects for further development are matters of special concern at present, says the *Wall Street Journal*, so prominent is the position which the industry has attained in world affairs. Figures obtained from the United States Geological Survey on production in the United States, as well as in the world, throw much light on the general question and are especially pertinent to the question of generating electric power by oil. The figures for the year 1920 indicate that the production of crude oil in the United States was about 443,000,000 bbl., or about 65 per cent of the world's production, while the consumption in this country was over 530,000,000 bbl.

Dr. David White of the Geological Survey, in an official publication, says that by unexpected good fortune in the search of new supplies, or even less unexpected curtailment of consumption, the petroleum production of the United States is likely not only never again wholly to meet our requirements, but even is liable to start soon on the long decline to waning output. He also mentions a dangerous growth of consumption demand, such as motor cars, the use of oil under steam boilers, the turning from coal to oil, produced by the coal strike, and the program of the Shipping Board.

Speaking about the effect of the industrial slump on the petroleum industry, A. W. Ambrose, chief petroleum technologist of the Bureau of Mines, says that he thinks the petroleum industry will recover far more rapidly than many other commodities. The increased consumption of gasoline, accounted for by the enormous growth of the automotive industry, is back of the sustaining of the petroleum industry. The oil industry today is living on its gasoline sales and nothing else. He declares that as soon as the economic depression is relieved the petroleum industry will be one of the first to benefit and demands for petroleum will advance rapidly and go beyond war-time consumption.

The real motor-fuel problem is not concerned with the swings of the business pendulum, although the present abundance of fuel is pointed to by superficial critics as showing how wrong have been the predictions of of those who have warned us of a future shortage. At present the underground petroleum reserve in the United States is only about 5,800,000,000 bbl. Were this oil to be extracted from the ground at a rate equal to that of the year 1920, a feat that is not out of the question from a practical standpoint, the reserve would last but thirteen years. It is thus evident that after a few years we must expect a decline in the domestic production of petroleum.

# Equipment and Its Maintenance

*Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments*

## Operating Company Builds Switching Locomotive

**A 45-Ton Switching Locomotive Constructed in the Shops of the Monongahela Power & Railway Company Was Built from a Discarded Ruined Freight Car**

A CONTRACT between the Baltimore & Ohio Railroad and the Monongahela Power & Railway Company provides for the switching over the tracks of the latter company of freight in carload lots from the yards of the Monongahela division to the tracks of the Little Kanawha Railroad, controlled by the Baltimore & Ohio Railroad, and to industries in South Parkersburg. This switching service increased at such a rapid rate that in 1920 the Monongahela Power & Railway Company found itself without adequate motive power to handle the carloads of freight offered for delivery. The purchase of a new and heavier electric locomotive was necessary, and accordingly inquiries were sent to the principal electric companies for a 40 to 45-ton electric locomotive arranged for 600-volt direct-current operation. The bids received were so unsatisfactory that the company decided to construct a locomotive in its own shops.

Locomotive Constructed from Old Equipment

The locomotive, as shown in an accompanying illustration, was built along lines of a standard steeple cab-type locomotive. A standard steel box-car center with steel bolsters riveted in place with wing gusset plates was used. This frame was purchased on a pound basis from a discarded and ruined freight car equipment and results have shown that it possesses the required stiffness, strength and other essentials.

The longitudinal sills of the engine body consist of six 7-in., 90-lb., T-rails, spaced three on each side of the steel center, and an insert of concrete, filled with scrap iron, was placed between these sills to give added weight to the locomotive. The floor of the locomotive is therefore a somewhat massive construction, but it has the weight and bulk necessary to furnish tractive power to the engine.

The trucks used were formerly standard freight trucks of the arch-bar type. The original arch bars were replaced with longer bars, so as to lengthen the wheelbase and provide space necessary for hanging brakes and motors. Cast-iron wheels of M. C. B. standard design of wheel, flange and tread were used. The electrical equipment consists of four G. E. No. 73 motors with a gear ratio of 17:73. These motors were carefully constructed with new commutators and some other additional repairs were made which were found necessary. Two controllers, type K-34, equipped with G-2 auxiliary ratchet switches, control the current in the power circuit.

The air brake equipment consists of two A-6 air compressors, each of 18-cu.ft. capacity, which work in unison to provide the air supply. The compressors are located one under each hood, while all the additional air-brake equipment except the brake cylinder and main reservoirs are located inside the cab. The brakes are Westinghouse type A.M.M. with M-22-A brake valves and M-1 triple valves. The locomotive is provided with air sanders which deliver sand to the front wheels of each truck. The general dimensions of the locomotive as constructed are:

| | |
|---|---|
| Length | 34 ft. 8 in. |
| Width | 9 ft. |
| Height, rail to running board | 12 ft. 4 in. |
| Wheelbase | 6 ft. 10 in. |
| Trucks, center to center | 20 ft. 8 in. |
| Axles | 5½ in. |
| Journals | 5 in. x 9 in. |
| Brake cylinder | 12 in. x 12 in. |

This locomotive as constructed is giving very satisfactory service and the entire cost was but $8,385.71. It is in constant service and handles from six to twelve freight cars.

## New Oil Circuit Breaker

AS AN ADDED economy in space for equipment of power houses and substations, the Condit Electrical Manufacturing Company has placed on the market the type D-17 oil circuit breaker with a relatively high interrupting capacity but of comparatively small overall dimensions.

A heavy and rugged frame construction is used throughout, with double tanks, supported by a heavily ribbed cradle, which in turn is hung by strong bolt construction with resilient features. The purpose of this type of construction is to absorb the mechanical shock incident to rupturing a heavy short circuit, and to reduce to a minimum the hazard which usually follows the throwing of hot oil and gases emitted on heavy short circuits. Double tanks as furnished on the type D-17 oil circuit breaker take care of this hazard. The inner tank contains the oil in which the switch contacts are immersed and is heavily reinforced at the top by a deep web on the frame. The outer tank in connection with the resilient features is so arranged as to chill the gases and to prevent the hot oil from being discharged from the breaker.

Type D-17 oil circuit breakers are built in single units for 500 to 1,200 amp. capacity at 15,000 volts and 500 to 800-amp. capacity at 25,000 volts, single throw, and can be furnished for single or multiple operation.

## New Cars for Texas Electric Railway

**Four Interurban Cars Arranged for Operation on Both 600 and 1,200 Volts Placed in Service—Equipment and Car Construction Provide for Hauling Two Trailers**

THE Texas Electric Railway, operating 277 miles of line between the cities of Dallas, Waco, Dension and Corsicana, recently placed in service four new interurban passenger cars. The car bodies were built by the St. Louis Car Company and the trucks by the J. G. Brill Company. The cars are equipped with four GE-225-B motors and PC-101-B control, arranged for operation on 600 and 1,200 volts. Air brakes are Westinghouse AMM type, with 12-in. x 14-in. brake cylinders. The air compressor is of the General Electric Type CP-78-B1, arranged for operation on 600 and 1,200 volts.

Current for operating the control apparatus and supplying the lights is furnished by a 32-volt, 1.5-kw. motor-generator with compound winding, which permits its operating on either 600 or 1,200 volts. Two General Electric J-37 headlights with 250-watt, 32-volt special bulbs are used. The interior of the car is lighted by eight 50-watt, 32-volt lamps with Holophane reflectors.

The cars have steel underframing and steel superstructure and as they were specified for service at 65 miles per hour, pulling two trailers, the underframe was constructed with six longitudinal sills, four of which are continuous from bumper to bumper. The side sills are 8-in., 13.75-lb. channels; center sills, 8 in., 18-lb. I-beams; intermediate sills, 8-in., 11.25-lb. channel and bumpers, 8-in.; 13.75-lb. channels bent to radius and reinforced with four ribbed Hedley anti-climbers. The bolsters are 12-in. x 1-in. soft steel. The side pier posts are 2½-in. x 2-in. angles; side window posts, 2 in. x 2 in.; tees and vestibule corner and end posts, 3½-in. x 3½-in. The side sheets and letter board are of ⅛-in. patent beveled plates, insulated with pressed cork board.

INTERIOR OF NEW INTERURBAN CARS FOR TEXAS ELECTRIC RAILWAY

The roof carlines are ½-in. x 2-in. soft steel, to which is applied suitable furring for nailing the ⅝-in. poplar roof, which is covered with No. 8 canvas duck. The sash and doors are made of quarter sawed oak and the floors of hard maple, with the exception of the toilet room, which is covered with Mastic flooring. The front and rear window sash and lower side sash are glazed with ³⁄₁₆-in. plate glass. The upper Gothic sash are glazed with Imperial prismatic glass of special design. Trucks are the Brill 27-MCB-3X type with 5-in. x 9-in. journals, 6-in. axle bearings, forged side frames and 37-in. rolled steel wheels.

The enamel system was used in painting and the cars are finished in Pullman green body color with white enameled ceiling. The interior finish of the car is dark oak. The signal system, supplied by the Ohio Brass Company, is arranged automatically to cut in the storage battery lights upon any failure of line voltage. The accumulator is arranged for constant

EXTERIOR OF TEXAS ELECTRIC RAILWAY CARS

recharge at 600 volts when the car is operating on either 600 or 1,200 volts. The seats, supplied by Heywood Brothers & Wakefield, are upholstered in Fabrikoid and built to the railway company's specifications. The trap doors and sash fixtures were furnished by the O. M. Edwards Company, couplers and trolley catchers by the Ohio Brass Company and the heater equipment by the Holden & White Company.

The principal dimensions of these cars are:

| | |
|---|---|
| Length over bumpers | 55 ft. 11 in. |
| Length over vestibule sheeting | 53 ft. 11 in. |
| Width over side sheets | 9 ft. |
| Length of smoking compartment | 17 ft. 6 in. |
| Length of main compartment | 21 ft. |
| Seating capacity, main compartment | 38 |
| Seating capacity, smoking compartment | 22 |
| Weight, completely equipped | 86,600 lb. |

## Titanium-Treated Rails

**Service Tests of Titanium-Treated Rails Extending Over Six Years Confirm Earlier Test Results—Thirty-seven Failures per 100 Track-Miles During This Period**

THE result of an extended series of investigations begun in 1913 to determine the effect of the use of titanium in rail steel has been published in bulletin form by the Titanium Alloy Manufacturing Company, Niagara Falls, N. Y. In the eight bulletins of the series which have been issued previously there appeared the result of metallographic and physical testing work which demonstrated the clearness and uniformity of titanium-treated rail steel and the physical superiority of this more uniform steel. The service results, which have now been added, prove conclusively that the evidence brought out earlier is reliable and that a uniformly good steel will make possible greatly improved rails.

### REASONS FOR THE INVESTIGATION

The purpose of these investigations was:

1. To show in detail the exact structural and physical differences between titanium-treated and untreated rails.
2. To find a simple, practical method for determining the efficiency of titanium treatment so that occasional improperly treated steel may be identified and separated from that free from excessive segregation.
3. To follow through the many thousand tons of titanium-treated rail which have been in service from four to six years.

The control of segregaton in open-hearth rail steel has always been a matter of great concern to the rail makers. During the years 1913 and 1914 samples of A-rails (top rail of the ingot) from 111 different heats of standard and 101 heats of titanium-treated open-hearth steel, made for six different railroads, were forwarded to the laboratories of the Titanium Alloy Manufacturing Company. Here the Pennsylvania Railroad segregation specification was applied to each of the A-rail samples from the 212 heats. A-rails from only 37 per cent of the heats of standard open-hearth steel passed the requirements, whereas A-rails from 93 per cent of titanium-treated heats passed the specification.

The determination in steel of titanium insoluble in hydrochloric acid is an index of the efficiency of the treatment and allows the identification of heats in which excessive segregation has occurred. The process is very simple and can be made quickly and accurately. This determination will ordinarily make further analytical work unnecessary because so high a percentage of titanium-treated rail steel will meet the required specifications for segregation. It has been suggested that in order to conform to regular mill practice all rails that pass the usual physical requirements be accepted by the purchaser. Samples for titanium determination should be taken by the inspector for the purchaser and sent to the laboratories or those of any agency it might employ.

The adoption of this simplified method should accomplish the following results: (1) Eliminate the majority of rail failures; (2) assure the purchaser of rails of more uniform steel throughout all the ingots of a heat; (3) permit a larger yield of acceptable rail by eliminating serious segregation in the upper portion of the ingots; (4) since segregation can be effectively controlled, make it desirable to raise the carbon content of the steel slightly, which would result in better wearing steel.

### TITANIUM-TREATED STEEL HAS LEAST FAILURES

A comparative test over six years in service seems to indicate that the titanium-treated steel has the least failures. In 1913 the Chicago & Alton Railroad obtained and laid in tracks 14,310 tons of standard 90-lb. A. R. E. A. open-hearth rail steel from four different mills and 6,000 tons of titanium-treated open hearth of the same weight and section. This tonnage was laid so that the service for all rail was approximately the same. Of the standard open-hearth steel there occurred 116 failures in the 101 miles of track, or 114 failures per 100 track-miles. On the other hand, the titanium-treated open-hearth steel showed an average of but sixteen failures in 42 miles of track, or thirty-seven failures per 100 track-miles.

Similar analyses of the rail failure statistics of the American Railway Engineering Association for 1918 showed average failures per year in service per hundred miles of track to be 13.7 for standard open-hearth rails as compared with 6.8 for titanium-treated open-hearth rails. Similar figures from the rail failure statistics contained in the report for 1919 show 14.6 and 4.9 failures respectively.

Attention is also called to the fact that the yield from standard open-hearth steel was 19.6 per cent less than that from titanium-treated steel, due to the greater freedom from segregation in the upper part of the ingots of the latter.

The war caused a great increase in the knowledge and use of alloy steels and these data should result in some great improvements in the quality of the steel rails and special track work used in the railway industry.

## Fin Nut Lock

AN INGENIOUS form of nut lock is being used on nuts of the third rail shoes used by the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company in New York, as well as at other places where a very tight lock is desired. The nut lock is made of annealed steel and consists of a disk or washer with inwardly projecting fins bent up so as to be of cone form. After this washer is screwed on the bolt, with the fins fitting into the thread, the lock is flattened out in its original form, jamming the fins into the thread of the bolt. The nut lock is removed by being cut off. This nut lock is manufactured by the Nutlock Corporation and is known as the Hold Tite Nut Lock.

HOLD TITE NUT LOCK

# American Association News

## Executive Committee Holds Important Meeting

**Approves the Report of the Reorganization Committee with Some Modifications —Appoints J. W. Welsh to Secretaryship—Considers Convention Program**

THE executive committee of the American Association held an important all-day meeting at association headquarters on Friday, Aug. 5. The morning session was devoted to a consideration of miscellaneous association matters of importance, and the afternoon session to a consideration of the report of the special reorganization committee.

The first business of importance was the appointment of a permanent secretary to fill the vacany caused by E. B. Burritt's resignation. The reorganization committee had recommended that J. W. Welsh be appointed to that position and after a thorough discussion of the situation, the executive committee took unanimous action in line with this recommendation.

The following applications from companies for membership in the association that have been received since the 1920 convention were presented:

RAILWAY MEMBER COMPANIES WITHIN THE BORDERS OF THE NORTH AMERICAN CONTINENT

| | |
|---|---|
| Brooklyn City Railroad Brooklyn, N. Y. | Joined June 11, 1921 |
| Valdosta Street Railway, Valdosta, Ga. | Joined July 14, 1921 |
| Sherbrooke Railway & Power Company, Montreal, Canada | Joined July 18, 1921 |

RAILWAY MEMBER COMPANY BEYOND THE BORDERS OF THE NORTH AMERICAN CONTINENT

Pernambuco Tramways, Light & Power Company, Pernambuco, Brazil, Joined March 2, 1921

RAILWAY MEMBER COMPANY REINSTATED SINCE THE 1920 CONVENTION

| | |
|---|---|
| Chicago & Interurban Traction Company, Chicago, Ill. | Resigned July 11, 1921 |

This company resigned in letter of June 5, 1920. In letter of July 11, 1921, indicated that it wished reinstatement and asked for data sheet on which to compute dues owing, which are for the years 1920 and 1921.

MANUFACTURER MEMBER COMPANIES WHO HAVE JOINED SINCE 1920 CONVENTION

| | |
|---|---|
| C-J-H Service Corporation, Buffalo, N. Y. | Joined October, 1920 |
| William V. Dee Company, Bridgeport, Conn. | Joined Feb. 7, 1921 |
| Kellogg Switchboard & Supply Company, Chicago, Ill. | Joined April 21, 1921 |
| McKinnon Automatic Lubricating Vacuum Company, Holyoke, Mass. | Joined October, 1921 |
| Milwaukee Tank Works, New York, N. Y. | Joined Dec. 7, 1921 |
| Republic Truck Sales Corporation, Chicago, Ill. | Joined July 15, 1921 |
| Standard Oil Company, Chicago, Ill. | Joined June 30, 1921 |

The applications of all of the above companies were formally approved.

Resignations of a few railway companies and of some manufacturing companies were received. Most of these have not paid dues for the past one or two years. The secretary stated that an effort was being made to secure the continued membership of some of these companies.

It was suggested that when companies present their resignations without having made payments of dues in full to date of resignation, the secretary of the association should have the case of these unpaid dues taken up by counsel, and that those companies not making payment in full be dropped from the membership list.

President Gadsden made a statement to the executive committee with reference to W. O. Gibson and the final result of the analysis of the association's finances made by W. R. Boylan. Mr. Gadsden stated that Mr. Gibson had pled guilty in court on Thursday, Aug. 4, and would be sentenced on Wednesday, Aug. 10. He also presented a statement by Mr. Boylan.

With the defalcation matter closed in this manner anyone else is officially cleared from any criminal connection with the defalcation.

The executive committee considered the status of several committee reports, advising those committees as to policy in making their final and complete reports.

A complete discussion of the convention program as now proposed was next had. There was an evident desire on the part of the entire executive committee to put into force the suggestions made by President Gadsden at the Chicago conference that there be ample provision for discussion at annual conventions. The subjects committee was advised by the executive committee that it desired to have the program shortened and some suggestions along this line were made; that it desired to have authors of most of the papers limited to ten to fifteen minutes to present the high points or an abstract of their papers which would have been usually printed and distributed and that ample time be scheduled for discussion of the subjects presented. Provision is also to be made for one entire session which may be devoted to a consideration of the changes in the constitution and by-laws recommended by the executive committee following the report of the reorganization committee.

### Reorganization Report Considered

The committee devoted the entire afternoon to a consideration of the report of the special reorganization committee. The principal points of this committee's report were outlined in the ELECTRIC RAILWAY JOURNAL for July 16, page 105. The executive committee adopted the report of the reorganization committee with some modifications, and will present an amended constitution and by-laws to the membership for action at the October convention. The report of the executive committee recommending these changes is now being printed, with the amended constitution and by-laws, and will be distributed to the membership at an early date.

The modifications which the executive committee made in the report of the reorganization committee follow:

A redefinition of the officers and membership of the executive committee as follows:

A president, to hold office for one year, eligible to re-election, *as recommended.*

Four vice-presidents, elected each year for a term of one year, designated first, second, third and fourth vice-president, eligible to re-election, *rather than to have two elected each year for two-year terms not eligible to re-election, and without designation, as recommended.*

Twelve members at large, six representing manufacturing companies, six representing operating companies, two of each to be elected each year for three-year terms, and not eligible to re-election to the same office, *as recommended.*

A treasurer, to hold office for one year, subject to re-election, *as recommended.*

The four presidents of the affiliated associations, *as recommended.*

All of the living past presidents, ex-officio members without power to vote; *rather than to have only the two junior living past-presidents, with power to vote, as recommended.*

The executive secretary, who is not a member of the executive committee, but who attends its meetings; he may not be the same person as the treasurer, *as recommended.*

A new provision that any elected member of the executive committee who is unable to attend a meeting of the executive committee may have the privilege of sending as a proxy any officer or employee of the same company member which that committee member represents. The further provision that if any elected member of the executive committee is absent and unrepresented by proxy for three consecutive meetings of the committee, his office shall automatically be vacant, is also added.

A modification of the definition of a quorum of the executive committee so that seven voting members are a quorum rather than a majority.

Provision that a majority of the finance committee and a majority of the policy committee rather than the full membership of both of them shall be chosen from the voting members of the executive committee.

The executive committee approved the suggestion of the reorganization committee that a special amendment be adopted at the 1921 convention which would not limit consideration of amendments to the exact wording presented by the executive committee, but that new and reworded amendments would be given official status on the floor of the convention in order that the most complete expression of the will of the membership of the association might be obtained.

The executive committee also approved the recommendations of the reorganization committee, given below:

That provision for membership of trackless transportation companies be made.

That a separate classification of membership be provided for consulting engineers, management and holding companies, investment bankers, etc.

That individual members from nonmember companies eligible to election be not admitted.

That the executive committee hold regular monthly meetings.

That nominations for officers be made by a nominating committee and announced to the association at least thirty days before the annual meeting, but that other nominations may be offered any time before the actual election.

That definite provision be made for a mid-year meeting now held as a mid-year conference, but without any special provision.

That certain standing and continuing committees be provided by the by-laws.

That dues now stated in the by-laws shall be maximum, which may be lowered, but after once lowered not raised, by the executive committee.

That more careful provision be made with reference to members in arrears and members desiring to withdraw.

That *Aera* be continued as a magazine, with the secretary advised against unnecessary duplication.

That definite steps be taken with reference to better handling of the funds of the association.

All of the above are provided for in the amended constitution and by-laws.

With reference to the other recommendations made by the reorganization committee, the executive committee approved all of them.

The reorganization committee had made no recommendations with reference to the admission of municipally-owned railways, but asked the executive committee to consider it in its own meeting. The executive committee did so, but voted not to recommend to the membership that municipally owned railways be admitted to membership.

The reorganization committee had suggested, in response to questions raised by certain members, that the executive committee consider the advisability of incorporating the association. Meanwhile the reorganization committee had made further study of the matter and recommended to the executive committee that the association do not incorporate. The executive committee approved this latter recommendation.

In line with its recommendation that there be a definite by-law provision for nominations in advance of the convention, the executive committee authorized President Gadsden to appoint a nominating committee of seven immediately which would report nominations for the 1921 election as soon as possible.

Those present at the morning session were President P. H. Gadsden, Vice-Presidents R. I. Todd and C. D. Emmons; President W. G. Gove, Messrs. F. R. Coates, H. R. Mallison, J. N. Shannahan, W. H. Sawyer, E. F. Wickwire, B. A. Hegeman, M. B. Lambert, proxy for H. D. Shute, John Barry, proxy for J. R. Lovejoy; Past-Presidents G. H. Harries and C. L. Henry, and the following who had been especially invited: J. K. Choate, E. C. Faber, J. F. Hamilton, H. B. Flowers, Harlow Clark and H. V. Bozell, and J. W. Welsh, secretary. Of these, Messrs. Gadsden, Emmons, Sawyer, Lambert, Barry, Clark and Bozell were members of the reorganization committee. Those present at the afternoon meeting were all of the above except Messrs. Coates, Hamilton, Flowers, Gove and Hegeman and with the addition of J. H. Pardee, past-president and member of the reorganization committee.

## Vernon Room Where the Meetings Will Be Held

ACCOMPANYING illustrations show the pavilion of Haddon Hall and the seating arrangement of the room in which the convention of the American Electric Railway Association will be held in October The hall is known as "Vernon Room" and is of ample size for metings of the association, measuring 85 ft. x 51 ft. Haddon Hall adjoins the Chalfonte Hotel, which appears at the left in the photograph.

The convention of the association will be held on Oct. 3-6.

## W. O. Gibson to Be Sentenced

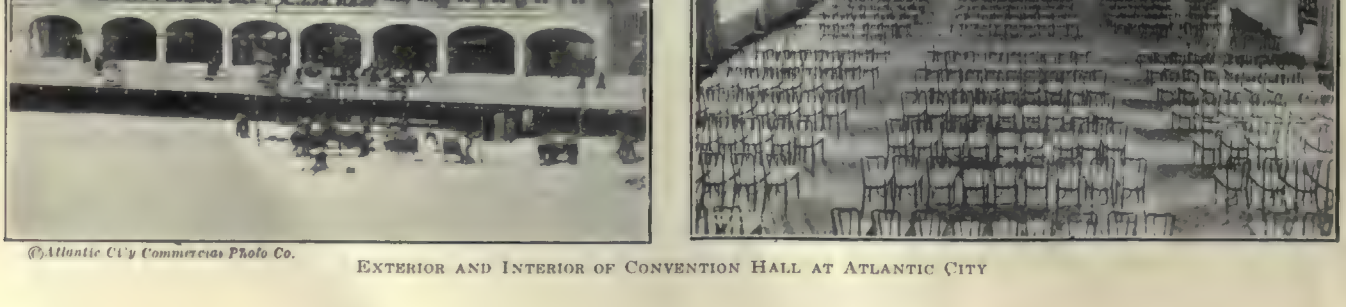
THE former bookkeeper of the association, W. O. Gibson, pleaded guilty to the charges against him on Thursday, Aug. 4, as was announced by President Gadsden at the executive meeting on Friday, the 5th. On Wednesday, Aug. 10, he was in court to receive sentence. Mr. Gibson requested a stay of sentence for two weeks. This was granted him, but his bail was cancelled and he was remanded to jail.

As the case now stands Mr. Gibson will receive his sentence on Aug. 24, and this should close the case so far as the association is concerned.

## Tax Plea Commended

THE argument presented by President Gadsden on public utility taxation before the Ways and Means Committee of the House of Representatives and reported in last week's issue of this paper is the subject of editorial comment in the *Public Ledger* of Philadelphia for Aug. 10. The editorial says in part:

> The plea that public utility companies be * * * put in a special class for the purposes of taxation, comes with more than the amount of plausibility usually assigned to arguments in avoidance of taxation. The plea is made by Philip H. Gadsden, * * * one of the country's foremost authorities on public utility questions. * * *
>
> It is an argument that carries weight. Viewed theoretically, there may be a fundamental weakness in certain of its clauses, for the regulatory bodies in charge of public utilities are supposed to allow for some of the objections made by Mr. Gadsden in setting and revising rates. But any one will admit that there is usually a difference between theory and practice. In practice it is an expense and a detriment to the conduct of the utilities companies' business every time they are forced to apply for a revision of rates. So the fact that the law would presumably allow, for instance, for an increase of rates to offset increase of taxation is not a convincing answer to Mr. Gadsden's argument, especially when it is taken into account that such an increase of rates would amount to an indirect tax on the general public using the products of the utility companies.
>
> Utility companies would be bound to pass on this tax to the public undiminished while there is enough elasticity in general business to make it possible that in many instances the tax would be absorbed by the industry and not passed on to the public; while in other instances it would be passed on only in diminished amount. Public utilities, as legally regulated industry, are actually set aside by law as a special class in the interest of the public. Why it is not logical to perpetuate this distinction in the field of Federal taxation?



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EXTERIOR AND INTERIOR OF CONVENTION HALL AT ATLANTIC CITY

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## "L" Lease Negotiations

### Philadelphia Rapid Transit Anxious to Operate New Line, but Seeks to Avoid Previous Mistakes

Conferences are being continued at Philadelphia over the operation of the Frankford elevated and so-called Bustleton line by the Philadelphia Rapid Transit Company. The attitude of the railway is that it is not willing to repeat the experience of 1918 in this same matter when the city and the company agreed to the terms of the contract only to have the Public Service Commission after a year's consideration of the matter deny approval to the lease. The company insists that a representative of the commission shall sit in at the conferences so that body may be thoroughly informed as to the angles which the negotiations take.

So much misstatement appeared following the conference on Aug. 1 that at the conference on Aug. 9 the railway set forth its attitude as a matter of record. The position of the company right along has been that it would operate the Rhawn Street extension of the Frankford "L" and also the Byberry extension of the Bustleton line, if desired by the city, but in such event the Department of City Transit, with the company's engineers, should jointly prepare the best estimate possible as to the cost of these extensions and the loss to be sustained from their operation; this being necessary in order to prevent later misunderstanding.

The Philadelphia Rapid Transit Company has argued against the city building its own powerhouses entirely for reasons of economy. Since the city is now to supply its lines completely equipped for operation, the attitude of the Philadelphia Rapid Transit is that the added investment should be determined and the increased obligation to be assumed by Philadelphia Rapid Transit in paying 5 per cent interest upon city investment should be figured out. A further estimate should be made in this connection, as of the latest date possible, to determine more closely the deficit, heretofore figured at $925,000, which Philadelphia Rapid Transit will sustain in the operation of the Frankford "L" line to Bridge Street and the Byberry line as far as Bustleton.

In short, the plan of the Philadelphia Rapid Transit contemplates the early operation of the Frankford elevated and Bustleton line, with free transfers between the Frankford elevated and surface feeder lines, the city to receive 5 per cent annually upon its investment, while the railway, in order to save the city an expenditure of $1,318,000, agrees to outlay $632,000 in enlarged facilities. This amount, added to the $925,000 deficit from operation, makes a total of $1,557,000 to be overcome at the outset.

As a further help to a better understanding of the issues involved the railway has included in a pamphlet which it issued recently the correspondence and contract embracing negotiations up to the time of submitting the draft of the lease to the City Council on March 31, 1921, including the joint reports of city transit and Philadelphia Rapid Transit engineers.

## Way Cleared for Extension

The last obstacle to the extension of the line of the Tacoma Railway & Power Company from Sixth Avenue along Washington Street into the Stevens Street district was removed recently when Attorney-General L. L. Thompson at Olympia ruled that the City Council had the the right to exempt the railway from the payment of 2 per cent gross sales tax and from the payment of street assessments. It remains now for the City Council and the company to settle details.

Mayor Riddell expresses himself as opposed to granting a release of the railway from its franchise obligations to pay the city a gross earnings tax and to pave between the rails. He does not believe the City Council has the power the Attorney-General says it has.

The company proposed some months ago to undertake construction of a line to serve the college of Puget Sound and Stevens Street district, provided certain relief was extended.

In his decision, the Attorney-General states:

> The Supreme Court has held in numerous cases that the city charters placing further restrictions upon granting of franchises than those provided by the state law are inoperative and that the legislative body of the city is restricted in its rights only by state law.

## Mr. Cunningham Discusses the Railroads

William J. Cunningham is contributing a series of articles on the railroad problem to the New York *Evening Post*. One of the series appears every Tuesday. The articles will run for an indefinite period. They are both informative and interesting. The idea actuating the *Post* was to secure an expression of opinion by a recognized authority on this important subject, and no other man that the *Post* could find combined so well the necessary practical experience and the detached point of view of the student. Mr. Cunningham has been a practical railroad man and has a national reputation as a railway statistician. During the Government administration of the railways he filled a position of great responsibility at Washington and he is now filling the James J. Hill chair of transportation at Harvard University.

## Mayor Signs Ouster

### Detroit Railway Confronted With Accepting $388,000 for Lines or $800,000 to Scrap Them

Disregarding the protests of the merchants located on Fort Street and Woodward Avenue, the Detroit City Council passed the ordinance ousting the Detroit United Railway from these two streets, where franchises have expired. The ordinance has been signed by Mayor Couzens. The Mayor and the city officials still believe that the city's offer of $388,000 for these lines will be accepted by the company and that the tracks will not be torn up.

A possible settlement of the controversy was seen in the Mayor's announcement that the Detroit United Railway would be permitted to operate its cars over the Fort Street and Woodward Avenue lines after the lines have been acquired by the city. The arrangement, the Mayor maintained, would have to be on a day-to-day agreement on a car-mile basis. The company had previously suggested that the city would be permitted to operate its cars over the company's tracks on Fort Street and Woodward Avenue, but the city is insistent that title to the lines in these streets shall lie with it.

The offer which the city has made for the Fort Street and Woodward Avenue lines is apparently the city's final action with regard to these lines, and unless some further proposition is made by the company, the city will insist on enforcing the ordinance which orders the company off the two streets.

Engineers for the Street Railway Commission started work the morning after the ordinance was passed surveying Fort Street for municipal lines. Plans will be laid for both temporary and permanent tracks so that as little delay as possible will result whatever action is taken by the company. The ordinance goes into effect thirty days after the signing by the Mayor and in ten days thereafter service must be discontinued by the company. Ninety days after the ordinance goes into effect the tracks must be removed from the streets.

Alex Dow, director of the company, has stated that the city's offer will not be accepted, and has intimated that the passing of the ordinance might mean discontinuing service immediately on the lines in question. In a few words the company is confronted with the problem of accepting the city's offer of $388,000 for the lines or spending a large sum to tear up the tracks and restore the streets.

Arbitration with regard to taking over by the city of the day-to-day agreement lines of the Detroit United Railway has been temporarily halted by the adjournment of the board of arbitrators until September when the board will again meet. In the meantime the engineers for the Street Railway Commission will have an opportunity to survey the cars and equipment which the city may acquire with the lines. Owing to the difficulty in specifying just what cars were provided by the company for use on the day-to-day lines, many cars have been designated for selection.

### $325,000 for Track Maintenance

According to a statement of F. I. Fuller first vice-president of the Portland Railway, Light & Power Company. Portland, Ore., the company expended $361,931 for maintenance and reconstruction on track, paving, overhead lines, cars, etc., on the city lines, exclusive of depreciation charges, and $160,619 on track maintenance and reconstruction and paving only on city lines during the first five months of 1921.

Mr. Fuller's statement calls attention to the efforts of the company to take care of necessary features connected with the maintenance of its lines, as set forth by its representatives when the Public Service Commission was hearing its petition for an increase in fares. He declares the corporation acted in good faith, and is fulfilling its obligations to the public as rapidly as possible considering all phases of the situation.

For the ensuing five months of June, July, August, September and October the expenditures for maintenance and reconstruction on track and paving on work already ordered and in sight will amount to over $325,000, or an average of $65,000 a month, about three times the expenditure for the same period in 1920.

Altogether the maintenance work on the city lines and equipment of the company is being carried on on a much more extensive scale than at any period in the last five years.

### Suburban Men Again on Strike

The employees of the Syracuse & Suburban Railroad, Syracuse, N. Y., went on strike on Aug. 4. The men dispute the statements attributed to officials of the company to the effect that the men had agreed at a meeting with the officials on July 22, to arbitration proceedings. They declare that at that time C. Loomis Allen, the president of the railway, was told that they could not accept the provisions of the arbitration agreement as drawn up by him, and that they did not sign.

This is the third suspension of operation by the road in a period of a little more than a year. There was a strike in May, 1920, which the men won after a tie-up of several days. From Jan. 1 to March 11 the road quit operation under the claim that it could not operate until certain franchise conditions were altered and wages lowered. The company was successful in the former and temporarily so in the latter contention, although it is that dispute which is the cause of the present strike.

## Arbitration Demanded

### Montreal Company Formally Notified to This Effect—Wages Cut Only 12½ Per Cent

The Montreal (Que.) Tramways was officially notified on Aug. 8 by the Federal Department of Labor that the employees' union had applied for a board of arbitration in the matter of the reduction of wages proposed by the company. The men have chosen as their representative Arthur Sauve, a member of the Quebec provincial parliament, but he has not yet signified his acceptance. The company has not yet announced any decision as to its nomination of an arbitrator on its behalf. Failing such action by the company, the Federal Act gives the Labor Department power to nominate a representative for the company, and the two nominees will then choose a third. The company, however, is under no compulsion to accept any award made by such an arbitration board.

Meanwhile the company has posted notices that a wage reduction of 12½ per cent will go into effect on Aug. 16. This is a substitute for the 20 per cent reduction proposed by the company and the 10 per cent reduction which the men's delegates were willing to submit to the union for acceptance.

Under the 12½ per cent reduction, first-year motormen and conductors will receive 39½ cents an hour, second-year men 44 cents, and those employed more than two years 48 cents an hour. One-man car operators will receive 4 cents an hour extra. This proposed scale is intended by the company to run from month to month, subject to change in accordance with circumstances. The management points out that earnings have been reduced by the industrial depression, resulting in a substantial decrease of the use of cars by the working classes.

The company is facing the necessity of raising between $5,000,000 and $10,000,000 within the next year. Part of this is needed to retire maturing obligations of $3,000,000, and part for extensions and improvements, on which about $1,500,000 is being expended this season, with others planned for next year.

So far, although both sides to the dispute are maintaining a firm attitude, there is no serious talk of a strike.

### Special Master in New Orleans Fare Case

Judge Henry D. Clayton, who is presiding in the Federal District Court for the eastern district of Louisiana, in the pending litigation between the New Orleans Railway & Light Company and the city of New Orleans, has appointed D. B. H. Chaffe, New Orleans, as special master to hear the evidence.

It will be recalled that Judge Rufus E. Foster, at the request of parties at interest, excused himself in this suit, which was brought by the city on the ground that the railway was without authority to continue charging an 8-cent fare as the ordinance giving it that right had expired by limitation.

In naming Mr. Chaffe, Judge Clayton announced that it would be impractical for the court to hear all the evidence. Mr. Chaffe was ordered to proceed at once to take testimony.

### Municipal Road "Saved" by Councilmen

Charles M. Robbins, Attleboro, Mass., is a peppery individual. He dislikes to vote away other people's money. As a member of the City Council there, he spoke right out in an open meeting recently giving his views about the municipally owned Norton, Taunton & Attleboro Street Railway. He said that he felt "that we (the councilmen) ought to unite and pray that some night the earth would open up and swallow the confounded road."

Mr. Robbins, as these remarks indicate, was vexed. He had reason to be vexed. His utterance preceded a vote by him to appropriate $2,000 of the funds of his fellow townsmen to meet a deficit in the operating expenses of the road. The other towns involved with Attleboro in the responsibility for running the road had previously voted proportionate amounts, so that there was little else for Attleboro to do than to shell out. Mr. Robbins might have to vote on the matter; he might even have to do so against his best judgment, but he did not have to be silent about it.

It seems that this road has been a source of constant annoyance ever since it was taken over by the municipalities. The private company was unable to make the road pay, and the cities, as might have been expected, have been no more successful at the task of keeping expenditures within income. Creditors are no respectors of persons, so the coal man, whose patience had been exhausted after he had made futile efforts to have his bill honored, brought suit for a receiver for the property. This would look like another rapacious act of the coal man, but that individual has enough sins charged against him. If the coal man hadn't acted, some other creditor undoubtedly would have done so. The coal man was first. That is all.

After the money had been set aside to pay the coal man, the meeting turned to other phases of the road's activities. Members of the Council began to delve into the operating figures of the road, but the results were by no means unanimously agreed upon. Howard G. Smith discovered the road to be a losing proposition. Councilor French saw a deficit of $30,000. Others insisted that the road was making money. Mayor Brady resented charges of mismanagement. Even the name of the Public Service Commission was taken in vain in connection with the matter, although the responsibility of that body for the plight of the road was not readily discernible.

# Service-at-Cost Recommended for Milwaukee

## Committee Reports Insuperable Obstacles to Immediate Public Acquisition of Local Utilities Under Present Available Methods—Construction of Competing Plant Deemed Not Advisable

**The city of Milwaukee, Wis., is recommended by the Milwaukee Street Railway & Electric Power Acquisition Committee to enter into negotiations with the Milwaukee Electric Railway & Light Company for the operation of the company's local electric railway and electric light and power properties under a service-at-cost agreement, with provisions which would result in the ultimate municipal ownership. The committee held that there were insuperable obstacles to the immediate public acquisition of the properties under the methods now provided by the law for such acquisition, primarily because of the inability of the city to obtain sufficient funds to consummate such a purchase.**

THE construction of a competing plant, aside from the questionable wisdom of such a course, was not thought to be an alternative open to Milwaukee because the Milwaukee Electric Railway & Light Company is operating under an indeterminate permit which amounts to a perpetual franchise that can be terminated only by municipal purchase. The city could not build a competing line without obtaining a "certificate of convenience and necessity" from the State Railroad Commission, which would require a showing to the satisfaction of the commission that the company was not rendering adequate service. The committee considered it beyond the range of probability that such a certificate could be obtained.

While the committee expressed the view that it could not assure the city of the success of the proposed "service-at-cost-and-acquisition" contract, it was unanimous in its opinion that this offered the most promising course for an attempt to better conditions and was the only practical method, in view of the city's financial situation and under existing laws by which ultimate acquisition was possible.

The committee suggested that if the 1914 appraisal of the property by the Wisconsin Railroad Commission, with additions to property since that date, were accepted both by the company and the city as a basis of negotiations on the subject of value, the prospect of ultimate agreement on this point would be hopeful.

The committee pointed out that while other means of transportation will be increasingly used in the future electric transportation on rails will continue to be the chief reliance for mass transportation over city streets for an indefinite period of time.

While the committee found that the city had the legal right to purchase the local public utility properties at any time, this was at the present time considered an empty right because of the city's inability to finance the purchase. The construction of a competing plant was not considered an alternative. The committee concluded, therefore, that:

> The question, therefore, as to the desirability of the public ownership of public utilities, for the present or immediate future, so far as the city of Milwaukee is concerned, is purely an academic question, since there is no practical method under the law as it has existed by which such public ownership can be brought about.
>
> It was the consideration of this fact, among others, which led the committee to inquire as to the feasibility of other methods of improving the public utility situation in Milwaukee, both by bettering the relations between the public utilities and the citizens of Milwaukee while the utilities are under private ownership, and by bringing about a situation under which the city can with less difficulty acquire such utilities at such time as the city may decide to do so.

The committee finally decided that a so-called "service-at-cost-and-acquisition" contract, if successfully negotiated by the company with the city, might tend to accomplish the end sought by the investigation. A bill permitting the city to negotiate such a contract with the company was therefore framed by the committee and upon receiving the approval of the Common Council was submitted to the State Legislature. There it was amended to provide that such a contract must receive the approval of the State Railroad Commission before becoming effective. The bill as amended became a law.

The essential features of the proposed contract as outlined in the committee's report are as follows:

> 1. Agreement as to the value of the properties made subject to the contract and a definite rate of return on such value.
> 2. Right to purchase the property by the city at the basis of value agreed upon whenever the city decides to do so.
> 3. The city to have the right to designate the service required of the utility, providing of course that the service will be of such a character and be rendered at such rates as will yield the return agreed upon, on the fixed value of the properties.
> 4. The city to have access to the books of the utility and its expenditures to be subject to the city's approval.
> 5. Right of the city to participate in the financing of the property.
> 6. The management of the properties to remain in the hands of the utility until such time as it is taken over by the city.

In discussing the fifth point the report stresses the importance of utilization of municipal credit in financing public utilities. In this connection the report says that a saving of more than $6,000,000 in interest charges might have been made during the period from 1911 to 1919 inclusive had the interest charges of the electric company been at rates equivalent to those paid by the city during the same period.

The conclusion is reached that

> Your committee believes that the time has come when an attempt should be made to relieve the cost of service rendered to the citizens of Milwaukee by public utilities of excessive interest charges. We believe this could be accomplished by a fair "service-at-cost-and-acquisition" contract, which would permit the city to participate in the financing of the utilities if it so desired, thus taking advantage of its superior credit to obtain money at low rates. No burden would be added to taxes, because the interest could be paid by the patrons of the utilities. At the same time, any excess beyond necessary requirements which might be accumulated in any reserve fund, instead of being applied toward the reduction of rates, could be applied toward the purchase of bonds of the utility or otherwise used to cut down the capitalization on which the return to the utility is calculated. This would result in the gradual acquisition by the city of an equity in the property of the utility, which would make it less burdensome for the city to take over the entire property whenever it should decide to do so.

The committee points out that all attempts to increase patronage should proceed along lines of approved business principles, the details of which will have to be worked out after the main provisions of the proposed "service-at-cost-and-acquisition" contract have been put into effect. The committee's answer to the question whether the service problem could not be better worked out under public ownership was of the same import. The committee thought that the service can and should be improved alike under public and private ownership. The question of electric railway service was reviewed in some detail in the committee's report on that subject.

In conclusion the committee stated that it was of the opinion that the most hopeful line of procedure for the city of Milwaukee to follow in an endeavor to improve the relations between the city and its utilities and secure better co-operation and understanding while the ownership remained in private hands, was in an attempt to negotiate a "service-at-cost-and-acquisition" contract. The committee stated that it believed this to be the only practical method under the law as it now exists by which, should the city desire, public ownership of such utilities might be brought about.

The committee's report on the financial history of the company alleged that as a result of certain transactions in the past, "water" had been injected into the capitalization of the company, which it was claimed—"total $9,753,832 or nearly the total face value of the common stock outstanding, which is $9,850,000." The criticism was also made that in the years 1918 and 1919 the company took approximately $1,000,000 out of some fifteen reserve accounts and added the amount to surplus which made it available for dividend purposes. In 1920 the report stated the company paid 7¼ per cent on its common stock out of current earnings and 4¾ per cent out of reserves previously created. The common stock thus received a return of 12 per cent.

In advertisements published to further the sale of a recent $3,000,000 issue of preferred stock, the company has made the following comment on the report of the Public Acquisition Committee:

> Within the past ten days the company has received another indorsement of equal interest to its investors, present and prospective. This second indorsement was contained in the report of the city of Milwaukee's committee on municipal purchase, etc. In this report, covering more than a year of inquiry, the committee submitted findings which may be briefed as follows:
>
> 1. The company's indeterminate permit is in effect a perpetual franchise, which can be terminated only by municipal purchase of the property and business.
> 2. The city has no means of raising the huge sum needed for such purchase.
> 3. The state would not permit the city to build competing systems, if the city had funds for that purpose.
>
> With regard to the value of the company's property, the report confirms the State's inventory as of Jan. 1, 1914, which showed

> actual values larger than the total outstanding securities and obligations. Whatever excess of capitalization may have taken place twenty years or more ago, the stockholders have long since replaced with solid property values, at their expense, out of earnings which were less than a fair return. The report's criticism of the transfer of surplus from reserve to dividend fund calls for this comment: that surplus was legitimately earned years before State regulation became effective, and was the undisputed property of the company's stockholders.
>
> The company recognizes the city's legal right to purchase its property and business, at their full fair value, any time the city may be able to find the purchase price. The company, in such event, will place no obstacle in the way of municipal purchase, being absolutely assured that every dollar of investment, past or future, represented by its securities, is amply protected against a penny of loss in case of such purchase. Pending action to purchase, which may be many years in the future, the company v welcome the city's co-operation in all measures calculated to get for the public increased good service at its lowest fair cost.

It is expected that the members of the Public Utilities Acquisition Committee will be appointed members of a committee whose function it will be to negotiate a "service-at-cost-and-acquisition" contract with the company.

The Public Utilities Acquisition Committee, as it is popularly known in Milwaukee, was appointed in July, 1919, by the president of the Milwaukee Common Council in response to a resolution calling for an investigation of the feasibility and advisability of the city acquiring the local electric railway and electric light and power utilities. The committee consisted of the following: Fred S. Hunt, a local manufacturer, chairman; William E. Black, an attorney at law; J. J. Handley, secretary Wisconsin State Federation of Labor; Lyle H. Olsen, general manager of the American Appraisal Company; and three members of the Common Council, namely, J. W. Radtke and Albert Janicki, Non-Partisan, and John Doefler, Jr., Socialist. The committee's report as submitted represents eighteen months' study of the local utility situation by the committee and by a staff of investigators working under the supervision of its permanent secretary, M. G. Glaeser of the Economics Department of the University of Wisconsin, assisted by H. G. Abendroth, an accountant.

## Surface Men Accept Cut

Following the reduction in wages of employees of the Interborough Rapid Transit Company, New York, N. Y., the receiver of the New York Railways, operating the lower Broadway and other important surface lines, conferred with the general committee of the Brotherhood of New York Railways Employees, to whom he explained the necessity of a reduction in operating costs.

The receiver asked the co-operation of the employees in this matter. The Brotherhood thereupon called meetings of its various locals. As a result, about 92 per cent of the members voted to accept a voluntary reduction of 10 per cent in the existing scale of wages, to take effect Aug. 7, 1921. The general committee in turn voted unanimously to accept on behalf of the Brotherhood such 10 per cent reduction in wages.

The maximum and minimum wages have been approximately as follows: motormen and conductors 59 to 67 cents an hour; engineering and shop force, 52 to 70 cents an hour; motor power, 52 to 90 cents an hour. There will be no change in hours or working conditions. Motormen and conductors work an average of ten hours a day and shop workers nine hours. Time and a half will still be granted for overtime.

## Mutual Insurance in Boston

### Elevated Railway Endeavors To Reduce Cost of Workmen's Compensation Insurance

Twelve officials of the Boston (Mass.) Elevated Railway have associated themselves together for the purpose of forming a new liability insurance company. A charter was obtained on March 8, 1921, authorizing the Transit Mutual Insurance Company to conduct a general insurance business on the mutal plan. On March 13 the State Insurance Commissioner issued a certificate to this company to do business.

The reason for forming the new insurance company was to attempt to reduce the cost of workmen's compensation insurance, on the Boston Elevated, the advance premium of which has grown from $115,000 in 1912, to $237,000 in 1921. The reason for this increase has been due partly to the increased benefits conferred by the Legislature by way of increasing the benefits to employees.

The Transit Mutual Insurance Company commenced business on April 1, 1921, taking two offices in the same building with the Boston Elevated Railway. The business is conducted by four employees, manager, stenographer, bookkeeper and investigator. It is the intention of this company for the first year not to solicit or accept business other than its present policy holders which consist of the Boston Elevated Railway as a subscriber under the Workmen's Compensation Act, and several automobile owners, landlords and tenants public liability policies.

All accidents to employees occuring over the entire system of the Boston Elevated Railway are reported in duplicate to the insurance company, one copy being filed in the office of the insurance company and the other being filed with the Industrial Accident Board, which has jurisdiction over the administration of the Workmen's Compensation Act.

The Boston Elevated Railway Company has approximately 10,000 employees and the officials having charge of these employees are all directors of the Transit Mutual Insurance Company. Through the close relationship existing between the two companies very effective safety work has been done since the insurance company started business. The cost of accidents to employees is set against the record of the foreman or superintendent in charge of each plant or location and this has a tendency to promote safety activities in each department to maintain a good record in accident prevention work.

The personnel of the board of directors and officials is particularly favorable to the success of the new company, all having had a wide experience in business and professional activities. The directors and officials of the Transit Mutual Insurance Company serve without compensation. The names of the directors and officials of the Transit Mutual Insurance Company are: Russell A. Sears, president; Stanley R. Miller, vice-president; John F. Stevens, vice-president; John H. Moran, secretary; Henry L. Wilson, treasurer; H. Ware Barnum, Edward Dana, Frederick S. Freeman, John Lindall, H. Bertram Potter, James Smith and Harry M. Steward.

Ralph C. Bush was appointed manager of the Transit Mutual Insurance Company at a meeting of the board of directors held on March 17, 1921. Mr. Bush is a lawyer and has been employed in the legal department of the Boston Elevated Railway since 1912. During that time he had charge of workmen's compensation matters and during the last year was engaged in the trial of accident cases.

## Employee Activities Successful at Kansas City

Annual elections have taken place among employees' organizations and committees of the Kansas City (Mo.) Railways. The first in importance of these events was the election for service during the third year of the plan of committeemen to serve under the representative plan. This election aroused keen interest among employees at all points and visions of the system. In most instances there were several candidates for positions, although close and exciting races resulted the best of feeling prevailed in the contests. There was no question of "policy" involved in any contest, the aim of voters being to select the employees best qualified to fulfill duties.

The Kansas City Railways Building, Savings & Loan Association held its annual meeting recently. F. G. Buffe, general manager of the company, was elected president, and E. E. Stigall, purchasing agent, vice-president. I. B. Nordyke continues as secretary, and L. M. Boschert as treasurer. Twelve hundred of the company's employees are members of the association, paying in an average of $10 a month. Applications for loans, chiefly for home building, are increasing as members establish savings sufficient to begin home planning.

The Railways Employees Brotherhood has a membership of 2,600 out of a possible 3,000. Dances or other entertainments are arranged by brotherhood committees in each division at least once in two months. The Brotherhood Baseball League has this year eight teams, an increase of two teams over last year. Games are being played at Tramway Park, provided by the company. The Brotherhood operates successfully a grocery store—successful not only in giving service, but in making a profit.

# News Notes

**Wages Cut in Dallas.**—The Dallas (Tex.) Railway has announced a 10 per cent reduction in wages, effective at once.

**Reduced Three Cents an Hour.**—A reduction in the wages of the motormen and conductors in the employ of the Beech Grove Traction Company, Indianapolis, Ind., will take effect on Aug. 16. Trainmen will be reduced from 41 cents an hour to 38 cents, trackmen from 38 cents to 30 cents, and one-man car operators from 46 to 43 cents an hour.

**Railway Man Flies.**—Horace Lowry, president of the Twin City Rapid Transit Company, Minneapolis, Minn., has just completed an airplane trip from Minneapolis to Chicago. The trip was made without event, except for a stop for fuel at La Crosse. Mr. Lowry, who is interesting himself in aviation, wished to try out an experimental trip. With A. L. Drum, construction engineer, he reached Chicago in time for the opening of the Progress pier celebration.

**Transportation in Shanghai.**—In a speech before the Civic League of Shanghai, Donald McColl, manager of the Shanghai Tramways, gave some very interesting material regarding transport in cities. His talk was applied especially to conditions in Shanghai and is unique in its charts, maps and diagrams depicting conditions in that city. The address has been printed in pamphlet form with all illustrations, and makes a valuable addition to the transportation literature of China.

**Men's Wages Cut Again.** — For the second time within a year the wages of conductors and motormen in the employ of the Rockford (Ill.) Traction Company have been reduced. The reduction which took effect on Aug. 1 amounts to 5 cents an hour. About the middle of January this year when the fare was advanced from 7 cents to 8 cents the pay of the trainmen, shopmen and office force was cut 7 cents an hour. The details of this cut were given in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 22.

**Railway Sued in Wage Case.**—One of the railways at Dayton, Ohio, that did not effect a wage settlement with its employees was the City Railway. That company finds itself confronted now with a petition filed in the Common Pleas Court in which it is alleged by five employees that there was a breach of contract on the part of the company through abrogation of its bulletin of July 6, 1920. It is alleged that the bulletin, whose terms were to have been in effect a year, provided that questions "in dispute shall be immediately submitted to a board of arbitration."

**City Starts Tearing Up Tracks.**—Judge Koch at Pottsville, Pa., on Aug. 3 issued an injunction against the chief burgess and fifteen members of Ashland Borough Council prohibiting them from tearing up the tracks of the Schuylkill Electric Railway until a hearing in court. The trouble arose over a demand that the tracks be placed in the center of Center Street instead of on one side, where new paving is in progress. The railway asserts it is financially unable to meet the demands for municipal improvements, coming from virtually every town on its route.

**Court Action Started on Alleged Improvements.**—Court action has been started in the Superior Court to compel the city of Seattle to construct additional car lines on East 55th Street, beyond Twenty-ninth Avenue N. E., for which, among other improvements, it is alleged a bond issue of $790,000 was sold May 21, 1919. The plaintiff is G. E. Hayes, for himself and other owners of the University Heights district, who claim they purchased real estate on the assumption that values would be raised by the improvement. A mandatory injunction to compel construction of the line is asked.

**Voluntary Reduction of Wages Accepted.**—Voluntary reduction of wages is proposed by members of the local union at Wilmington, Del., with a view of co-operating with the Wilmington & Philadelphia Traction Company, in the hope of helping to restore prosperity. Resolutions have been adopted that whenever the number of paying passengers carried in any month is lower than that of the average earned in the corresponding month of the years 1919 and 1920, with other conditions as at present, the employees will accept a reduction of 5 cents an hour for that month.

**Wages Cut in Harrisburg.** — Announcement has been made by officials of the Harrisburg (Pa.) Railways that effective on Aug. 16 the wages of all carmen will be cut 10 per cent, or 5 cents an hour. The new scale will give first-year men 43 cents an hour, second-year men 44 cents, and third-year men 45 cents. The reduction cancels the voluntary 5-cent increase made on March 20, 1920. The reason given for the reduction was the decline in riding. The Valley Railways also announced a similar reduction to take effect the same date. These two companies serve Harrisburg and adjacent counties.

**State Rulings Supreme.** — According to a recent ruling of Judge John H. Cotteral, in the United States Court of the Western Oklahoma district, the State Corporation Commission has undisputed power to modify or abrogate contracts made between two public utilities. This decision was rendered in the case of the Oklahoma Gas & Electric Company, seeking an injunction to restrain the Corporation Commission and the Oklahoma Natural Gas Company from carrying into effect the city gate rate order governing charges for natural gas delivered to local distributing companies. The court held that the power of the state is supreme and that it can change existing contracts.

**Referee Suggested at New Orleans.**—The Electrical League of Louisiana has injected itself into the New Orleans trolley tangle. It has addressed a communication to the Commission Council suggesting the appointment of a referee to whom shall be presented every phase of this now nationally known controversy, and it proposes that his ultimate decision shall be binding upon both the city and the New Orleans Railway & Light Company. It is suggested that a man with a national reputation as a utility expert be appointed. Along these lines the communication names Samuel Insull, Chicago; Henry L. Doherty, New York; Charles H. Edgar, Boston, and A. Merritt Taylor, Philadelphia.

**Franchise Amendment in Hamilton.**—A new amendment to the present franchise of the Cincinnati & Dayton Traction Company operating in Hamilton, Ohio, will become effective as soon as the company is able to provide new and modern safety car equipment. This amendment provides for the operation of one-man safety cars and simultaneously an increase in fare of from six tickets for 25 cents, and half fare for children, to 5 cents straight fare for adults and children, for a period of six months. If at the end of six months the straight 5-cent fare does not provide sufficient revenue to pay all operating expenses and fixed charges, with a proper return on the investment, then the fare will automatically go to 6 cents.

**New Franchise in Highland Park.**—The Chicago, North Shore & Milwaukee Railroad has succeeded after several years of negotiations in securing a new thirty-year franchise through Highland Park, Ill. The franchise was approved by the City Council and later passed by the people at a special election. The former franchise expired several years ago. Among some of the more important provisions of the new franchise is the requirement that in case the Chicago & Northwestern Railroad, whose tracks parallel those of the electric line, should elevate or depress its tracks through Highland Park at any time, the electric line shall likewise elevate or depress its tracks simultaneously. In case such grade separation is built the franchise becomes perpetual. The franchise calls for a number of improvements in the way of paving, a new station, etc., to be built within the next two or three years. All poles set in the future as the old ones are replaced must be of ornamental steel or concrete. Two main tracks through the city are permitted, those now existing; but in case of elevation or depression, the company is to be permitted to build four tracks.

# Financial and Corporate

## Bill Would Handicap Financing

**Investment Bankers Opposed to Passage of Dennison Bill Introduced in House of Representatives**

Several bills now pending before Congress have for their purpose suppressing the fraudulent offering and sale of securities. These are typical blue-sky bills, seeking to have the Federal Government take the same jurisdiction over the regulation of security offerings that is now taken by some states.

One of these bills, known as the Dennison bill, which is pending in the House Committee on Interstate Commerce, if passed, would entail great hardship on all public utilities in any financing activities. The Investment Bankers' Association of America has taken a stand against this particular bill. That body contends that if the measure now pending is enacted into law, it would compel every corporation issuing stock and every borrower issuing bonds as well as all offerers of securities to secure the advance approval of such issues in each and every state where the offering is advertised, through the public press, the periodicals of country-wide circulation, is sold through the mails and is arranged for sale by telegraph or telephone in states having blue-sky laws.

The Investment Bankers' Association further explains that if this bill becomes a law, long-established methods of selling securities would have to be changed, or banks and dealers offering the issues would become involuntary criminals. In short, before any securities intended for country-wide distribution could be offered for sale they would have to be approved in advance in practically every one of the thirty-eight states having blue-sky laws in force. Aside from the fact that legislation of the Dennison bill type is considered impractical, it would add an unwarranted cost to legitimate borrowing by the business interests of the country.

The association is supporting another bill, known as H. R. 7868. This measure is intended to curb the sale and offering of fraudulent securities through the agencies of special committees in each Federal Reserve Bank district. These committees would be so organized that as soon as the offering of a fraudulent security came to their attention they would inform the Federal Department of Justice, so that the legal machinery could be set in motion not only to stop the further offering of such securities, but to punish the offender if he continued to offer them. This bill provides that there shall be no interference in any way with any state blue-sky law now in force or that may be adopted, but that it shall supplement such blue-sky laws. The bill proposes a somewhat similar type of legislation to that recently adopted by some of the states, notably New York, Maryland and New Jersey.

## $12,000,000 Increase in Net in Seventeen Years

Stone & Webster, Inc., has issued a chart showing the combined earnings of all the companies under its management, the relation of these earnings each year to the outstanding capital and the resulting effect upon security values as reflected in market quotations. The operating expenses and taxes are shown in one color, interest charges in another, dividends in a third, and balance for reserves and replacements in a fourth color.

The chart shows that the gross earnings have increased from $9,000,000 in 1904 to $40,000,000 in 1920, and the net from $3,000,000 in 1904 to $15,000,000 in 1920. During this period of seventeen years there have been only two years, 1915 and 1919, when gross and net earnings were not larger than in the previous year.

The capital outstanding, consisting of bonds, coupon notes, preferred and common stock, has increased from approximately $73,000,000 in 1904 to $219,000,000 in 1920. In 1904 for each dollar of the gross earnings there was outstanding $8 of capital, divided between $3.50 of debt and $4.50 of capital stock. In 1920 for each dollar of gross earnings, there was outstanding $5.40 in capital divided between $2.60 of debt and $2.80 of capital stock.

The statement declares that during the past five years, out of a combined balance after interest charges of $35,000,000 only $15,000,000 was distributed in dividends and more than $20,000,000 was turned back into the properties.

**Stock to Retire Debentures.**—The stock of the Texas Electric Railway, Dallas, Tex., has been increased from $10,000,000 to $12,500,000 to provide for an issue of first preferred stock to retire debenture.

## City Expert's Report Expected

Utility Expert Ballard, who has been employed by the city of New Orleans, La., to make another valuation of the property of the New Orleans Railway & Light Company, is now actively engaged at the task and is being assisted by a corps of aids. Mr. Ballard is credited with the statement that from the present outlook he will not be ready to submit his report to the Commission Council before Sept. 1.

The city authorities do not look for a settlement of the railway problem before January, 1922, even if the report of Mr. Ballard should be ready for submission to them in September. The officers of the railway themselves say that it will require from four to six months to install the needed machinery and power equipment required to bring the plant up to the standard of efficiency desired, after the matter of valuation, rate of return and fare has been decided.

## Dangerous Tendency Shown in Recent Financing

The interim report of the subcommittee on electric securities of the Investment Bankers' Association on "The Importance of Adequate Junior Financing," referred to in the ELECTRIC RAILWAY JOURNAL for July 2, contained the accompanying table prepared for the association by Frederick M. Peyser, of the *Commercial & Financial Chronicle*. This table was secured by going over the files of the *Chronicle* for the past fifteen years, listing all the offerings or notices of issue of securities by note percentages were 88.58 as against stock percentage of 11.42. electric light and power, gas, traction, waterworks, and telephone companies, and then classifying them into tables of the total bonds, notes, preferred stock, and common stock.

The figures as given for the total of fifteen years show a combined note and bond financing of 79.81 and a combined stock financing of 20.19 as against the theoretical 50-50.

The figures were prepared for each year and then arranged in three-year periods, with percentages for each class of security for each period, and also with percentages of each class of security for the fifteen-year period.

During the last three-year period (1918-1919-1920), the total bond and

COMPILATION SHOWING PERCENTAGES OF SECURITIES USED IN FINANCING

| | Common Stock | Per Cent | Preferred Stock | Per Cent | Notes | Per Cent | Bonds | Per Cent | Total |
|---|---|---|---|---|---|---|---|---|---|
| 1906<br>1907<br>1908 | $195,399,687 | 21.23 | $21,381,475 | 2.32 | $156,624,000 | 17.02 | $547,007,400 | 59.43 | $920,412,562 |
| 1909<br>1910<br>1911 | 246,292,890 | 19.86 | 89,041,700 | 7.18 | 161,655,000 | 13.04 | 742,881,503 | 59.92 | 1,239,851,093 |
| 1912<br>1913<br>1914 | 164,458,440 | 10.64 | 133,919,400 | 8.66 | 288,493,888 | 18.66 | 959,224,661 | 62.04 | 1,546,096,389 |
| 1915<br>1916<br>1917 | 190,972,883 | 14.02 | 113,460,621 | 8.33 | 351,234,625 | 25.78 | 706,686,472 | 51.87 | 1,362,354,601 |
| 1918<br>1919<br>1920 | 99,226,400 | 6.63 | 71,731,321 | 4.79 | 684,407,513 | 45.69 | 642,423,104 | 42.89 | 1,497,788,338 |
| Total for 15 years | 896,330,300 | 13.65 | 429,534,517 | 6.54 | 1,642,415,026 | 25.01 | 3,598,223,140 | 54.80 | 6,566,502,983 |

## San Diego's First Quarter Good

### 14 Per Cent More Riders at 5 Cents, 10 Per Cent More at 7½ Cents, and Only 1½ Per Cent Fewer at 10 Cents

Operating statistics of the San Diego Electric Railway for the first quarter of 1921 appear below. The figures for 1920 were printed on page 875 of the issue of this paper for May 7. The statistics are particularly interesting because of the zone system of fares used on this property. The revenue from transportation, compared with the first three months of 1920, increased from $317,865 to $346,962 or 9.15 per cent, this being due to an increase of approximately 9 per cent in revenue passengers. This average came through a 14.01 per cent increase in 5-cent short-haul riders, a 10.48 per cent increase in 7½-cent (four tickets for 30 cents), two-zone riders, a 1.48 per cent decrease in 10-cent cash two-zone riders, and a 0.75 per cent decrease in miscellaneous ticket riders. The fact that the 7½-cent tickets sold in larger numbers while the equivalent 10-cent cash fare decline is evidence of the popularity of the company's plan to improve fare collection and schedules, as well as to stimulate riding, through the sale of easy-to-use and easy-to-spend transportation.

At the same time it was found possible to decrease car-miles by 11 per cent and thus to increase the density of traffic (passengers per car-mile) by 23 per cent. This is also reflected by the fact that the seats offered were reduced from 11,391,482 to 9,164,314 or 19.55 per cent, while leaving 1.43 instead of 1.94 seats per passenger carried—a decline of 26.29 per cent. Detail operating data presented in the two accompanying tables show also the increase in revenue per car-mile from 35.09 cents to 42 cents, or 17 per cent.

GENERAL OPERATING STATISTICS OF SAN DIEGO ELECTRIC RAILWAY

| | January-March 1921 | January-March 1920 | Per cent Change |
|---|---|---|---|
| Revenue from transportation | $346,962 | $317,865 | 9 15 |
| Revenue from other railway operations | 1,412 | 17,945 | *92.11* |
| Non-operating income | 2,787 | 3,240 | *13 97* |
| Total income | $351,162 | $339,050 | 3.57 |
| Revenue Passengers Carried: | | | |
| Cash Fares | | | |
| 5 Cents | 2,176,534 | 1,909,012 | 14.01 |
| 10 Cents | 178,366 | 181,049 | *1 48* |
| Other | 8,500 | 8,474 | 0.31 |
| Total cash fares | 2,363,400 | 2,098,535 | 12.62 |
| Revenue Tickets | | | |
| 7½ Cents | 2,171,606 | 1,965,491 | 10.48 |
| Other | 932,059 | 939,119 | *0.75* |
| Total revenue tickets | 3,103,665 | 2,904,610 | 6 85 |
| Total revenue passengers | 6,384,604 | 5,859,237 | 8.97 |
| Car-Miles and Car-Hours | | | |
| Car-miles operated | 833,793 | 943,854 | *11.66* |
| Car-hours operated | 89,410 | 99,210 | *9 88* |
| Car-miles per car-hour | 9.32 | 9.51 | *2.00* |
| Revenue passengers per car-mile (exclusive of transfers) | 6.56 | 5.30 | 23 72 |
| Total passengers per car-mile (inclusive of transfers) | 7.66 | 6.21 | 23 35 |
| Seats offered | 9,164,314 | 11,391,482 | *19.55* |
| Seats per passenger | 1.43 | 1.94 | *26.29* |

CAR-MILE STATISTICS IN CENTS PER CAR-MILE, SAN DIEGO ELECTRIC RAILWAY

| | January-March 1921 | January-March 1920 | Per cent Change |
|---|---|---|---|
| Revenue from transportation | 41.61 | 33.68 | 23 05 |
| Revenue from other railway operations | 0.17 | 1.90 | *91 05* |
| Non-operating revenue | 0.33 | 0.34 | *2 94* |
| Total income | 42 11 | 35.92 | 17.23 |
| Revenue Passengers Carried per Car-Mile | | | |
| Cash Fares | | | |
| 5 Cents | 2.61 | 2.02 | 29.21 |
| 10 Cents | 0.21 | 0.19 | 10.53 |
| Other | 0.02 | 0.01 | 10.00 |
| Total cash fares | 2.84 | 2 22 | 27.93 |
| Revenue tickets | | | |
| 7½ Cents | 2.60 | 2 09 | 24.40 |
| Other | 1 12 | 0.99 | 13.13 |
| Total revenue tickets | 3.72 | 3.08 | 20 78 |

Note—Italics denote decrease.

## Pacific Electric Would Abandon Its Harbor Lines

The Pacific Electric Railway, Los Angeles, Cal., has asked the California State Railroad Commission for permission to abandon its entire local railway system of some 5 miles of single track in the Los Angeles Harbor District if the property owners of the harbor district continue to insist that the company double-track its system on Sixth Street at a cost of $80,000. Announcement to this effect was made on July 27 by H. B. Titcomb, vice-president of the railway. The company is operating its local lines in the harbor district at a loss, and additional expenses heaped upon the company at this time will merely add to these losses.

Mr. Titcomb said:

> The city has granted permits for the operation of jitneys on Pacific Avenue and Sixth Street, and these buses operate over the very pavements we have paid for and on which we pay taxes. It costs the Pacific Electric 33 per cent of its gross for taxes and upkeep, while it costs the jitneys little or nothing by comparison. We cannot continue operating at a loss, and we hope the Railroad Commission will be able to see the predicament in which our system has been placed in the harbor district. The jitney has taken a large toll of our harbor city travel, and if we are compelled to make further heavy expenditures there we will be compelled to abandon our San Pedro system.

## Business Poor on Electrified Line in South Jersey

According to the twenty-fifth annual report of the West Jersey & Seashore Railroad for the year 1920, the net income showed a deficit of $463,148. The company either owns or operates under trackage rights 361 miles of track and two ferryboat lines of 2 miles. The combined compensation and operating results for 1920 show a decrease of $1,094,000 compared with 1919.

The total railway operating revenues were $13,914,442 and operating expenses $13,999,620, leaving a net deficit from railway operation of $85,177. Deducting railway tax accruals amounting to $571,832, which amount is equivalent to nearly 5 per cent return upon the capital stock, and net hire of equipment and joint facility rents—which amount to $382,000, makes the net operating deficit $1,039,063; other operations, however, netted a profit, so that the deficit for the year was only $363,699 before setting up the sinking fund reserve.

More than 60 per cent of the gross revenue is derived from passenger traffic. The company relies mainly upon its summer business to earn fixed charges and dividends and to offset the operating deficit that accrues during the balance of the year.

## I. R. T. Notes Extended—$4,000,000 Saving in Expenses

The Transit Commission at New York City has authorized the Interborough Rapid Transit Company, New York, N. Y., to extend to Sept. 1, 1922, its $38,144,400 of outstanding 7 per cent convertible gold notes which become payable on Sept. 1, 1921. The renewal will be at the interest rate of 8 per cent. In a circular to the noteholders, the company declares it is unquestionably to the interest of the holders of the 7 per cent notes to preserve the existing status by agreeing to renew the notes "rather than to precipitate a receivership when the company is apparently on the eve of a recovery of its credit."

Chairman McEneny, of the commission, stated that the commission was of the opinion that the interest of all concerned will best be served by reasonable extension of these notes.

Concerning the company's condition and prospects, the circular to noteholders says:

> The company has completed a readjustment of its wage rates, effective July 24, 1921, by which its employees, to help avoid a receivership, have agreed to accept a reduction of 10 per cent, thus effecting a saving at the rate of $2,600,000 a year.
>
> Reductions in the price of coal and supplies, together with operating economies due to mechanical improvements devised by the management, will effect a further annual saving of at least $1,500,000, or an aggregate reduction in expenses at the rate of more than $4,000,000 per annum for the present fiscal year ending June 30, 1922.
>
> The total of these expected economies very closely approximate the $4,464,000 by which the company failed to meet fixed charges for the fiscal year ended June 30, 1921, during which period, however, the peak of extraordinary costs was passed.
>
> It is reasonable to expect that with these

economies of more than $4,000,000 the company will be able to pay fixed charges, including interest on the 5 per cent bonds and these notes, and also to provide for current expenses.

Thus with the notes extended and the continued indulgence of its general creditors, the company should be able to maintain, and probably gradually improve, its present position until the Transit Commission shall have had an opportunity for action in the premises.

# Financial News Notes

**Haytian Property Sold.**—An order has been signed by Federal Judge Mack authorizing the sale of the assets of the Haytian-American Corporation to five creditor banks for $650,000. This was the only bid received. The banks are the Irving National Bank of this city, the Fletcher American National and the Continental National of Indianapolis, and the National Exchange and the Second National of Baltimore.

**Value Placed on Massachusetts Property.**—The Interstate Commerce Commission has found $150,000 to be the final value of the Conway Electric Street Railway. The line extends from Conway to Deerfield, Mass. The commission finds that it would cost $192,505 to reproduce the line. The corporate operations of the carrier from April 2, 1895, to June 30, 1914, the valuation date, resulted in net earnings of $61,208. The carrier never has paid dividends. The investment in road and equipment was found to be $234,305.

**Detroit Bonds Taken Up.**—Announcement has been made that the $1,400,000 first consolidated mortgage bonds of the Detroit & Flint Railway, which matured on Aug. 1, 1921, will be taken up from the present holders upon presentation to the Central Union Trust Company, New York. The Michigan Public Utilities Commission has approved the issue of $4,000,000 of Detroit United Railway first mortgage collateral 8 per cent sinking fund bonds. These bonds were placed for refunding purposes.

**Tacoma Seeking to Get From Under.**—The city of Tacoma, Wash., has been promised a hearing before the United States Shipping Board in connection with its claim for cancellation of the debt of $232,000 advanced by the Shipping Board for double-tracking the municipal railway to the tide-flats, constructed as a war measure. The city takes the position that the line was put in as a war measure and that the Federal government should not require the city to shoulder the burdensome line, which since the war has been a continuous liability.

**Lines Running to Princeton Consolidated.**—Four electric railways operating between Trenton and Princeton, N. J., which have been affiliated for some time, have been consolidated as the Trenton-Princeton Traction Company. The lines amalgamated are the New Jersey and Pennsylvania Traction Co.; Trenton, Lawrenceville & Princeton Railway; Trenton, Lawrenceville & Princeton Railroad and Princeton Street Railway. The lines were built by Albert and Tom L. Johnson and their associates. The consolidation is mostly in the interest of economy in administering the affairs of the companies.

**Another Customer Ownership Campaign.**—The Evansville Gas & Electric Company, operating the city railway lines and the gas and electric light plants at Evansville, Ind., has circulated folders and letters appealing to the people of Evansville to buy stock in the company. The 500 employees of the company are aiding in selling the stock. Frank J. Haas, vice-president and general manager of the company, says that about 30 per cent of the stockholders of the company are women. In the present stock campaign an especial appeal will be made to housewives to buy the stock offered by the company.

**Change in Status of Bonds.**—A meeting of holders of French currency bonds of the Quebec Railway, Light, Heat & Power Company, Quebec, Canada, was set for Aug. 11, to consider the proposal of the company for the payment of overdue interest coupons and the conversion of the outstanding bonds into income bonds, after the making of the partial cash payment. The two bond issues affected are those forming part of an authorized issue of 60,000,000 francs, French currency, executed in March, 1920, and part of an authorized issue of 13,000,000 francs executed in January, 1911.

**Railway Loses $342,681.**—For the six months ended June 30, 1921, the International Railway, Buffalo, N. Y., increased its operating revenue over the same period a year ago from $5,126,729 to $5,274,178. Operating expenses and taxes increased more than $500,000, which left an operating income of only $388,973, against $770,183 a year ago. The deficit for the six months period is $342,681, against a deficit for the first six months of 1920 of $34,722. The gross revenues failed by $916,683 to provide for depreciation, taxes, etc.

**Sale Under Foreclosure Ordered.**—Public sale of the property of the Vincennes (Ind.) Traction Company was ordered by Judge Francis E. Baker, United States district judge, in a decree of foreclosure filed in Federal Court at Indianapolis on July 22. According to the terms of the decree the sale will be held about the middle of September. It is ordered that no bid of less than $150,000 be accepted. The decree is the result of a petition of the Mercantile Trust Company, St. Louis. According to the decree there are now outstanding bonds amounting to $282,251, principal and accrued interest. These bonds were put out in two issues, the first for $200,000 in January, 1903, due in 1923; the second for $50,000 in May, 1906, due in 1931.

**$55,789 Increase in Balance.**—The Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., reports for the year ended Dec. 31 total operating revenue of $1,431,562, compared with $1,251,651 for the previous year. Operating expenses $920,879, against $903,399; railway operating income $456,786, against $383,688; net income available for dividend $111,576, compared with $55,787. After deducting dividends on preferred stock amounting to $30,000 there was left a balance to profit and loss of $81,576, against $25,787 for 1919.

**Marietta Line Run at Loss.**—The Monongahela Power & Railway Company lost the sum of $924.61 in operating its railway system in Marietta, Ohio, during the month of June, according to figures submitted to the City Council. The line included in the statement is designated under the sixty days' trial period as Route No. 1. Council ordered the company to proceed immediately with the removal of the rails on streets where the lines have been abandoned. City Solicitor Ward was asked for an opinion regarding proper procedure and he stated that it was his understanding that the railway had given up its rights and if a majority of the residents favored removal of the tracks he did not see why Council should not decide favorably and order the company to comply.

**New Bond Issue for Chicago Motor Bus.**—The Lake Shore Motor Bus Corporation, which is the successor to the Chicago Motor Bus Company, is offering through the Stanwood Company, investment bankers of Chicago, an issue of $750,000 of 8 per cent first mortgage and collateral trust sinking fund bonds. The amount now offered is half of an authorized issue of $1,500,000. The bonds are due Dec. 1, 1935, and are being sold at 97½ to yield about 8.40 per cent. The prospectus of the company states that for the first six months of the current year the bus company carried 3,541,747 passengers, an increase of 810,074 over the same period in 1920. It also states that as soon as feasible, service will be extended to the South Side in Chicago. The company holds a franchise for this extension.

**$9,172,500 of Notes Paid.**—The Philadelphia Company, operating the Pittsburgh Railways, has called for payment before maturity the outstanding $9,172,500 of three-year 6 per cent secured gold notes, due Feb. 1, 1922. This clears off a part of the refinancing program which the company must carry out during the next year. In addition to the three-year notes, which have been called for payment on Oct. 1 at 100½, the company has an issue of $9,794,000 ten-year 5 per cent debenture bonds falling due May 1, 1922. Payment of the three-year notes has been provided for through funds which came into the company's treasury through the recent issue of $10,000,000 bonds by the Duquesne Light Company, the proceeds of this issue having been turned over to the parent company in payment for properties acquired by the light subsidiary.

# Traffic and Transportation

## Trackless Trolleys Opposed

The International Railway, Buffalo, N. Y., may withdraw its petition asking permission to operate trackless trolleys on Bailey Avenue as a result of the opposition to the plan. At a recent hearing this method of transportation was strongly objected to on the ground that serious damage would be done to the pavement.

Herbert G. Tulley, president of the International Railway, and Thomas Penney, attorney for the company, appeared at the hearing in support of the petition. Mr. Tulley said that he wanted the experiment tried until January, 1923, but he would not guarantee the property owners against damage. He said further that it was for the purpose of supplying some kind of service in the northeastern section of the city that he wanted to try the trackless trolley.

Mr. Penny declared that if the people were averse to the plan the petition would be withdrawn. The Council decided to defer action on the matter until Sept. 9.

## Traffic Laws Must Be Observed

Traffic congestion has become one of the biggest problems that is facing the Dallas (Tex.) Railway. The Dallas Safety Council, which was organized several months ago, is co-operating with the railway and has suggested a rearrangement of the tracks in the east section of the business district. The city of Dallas has the backing of the railway and the Council in the matter of enforcing traffic rules as a means of reducing accidents.

The city, through the chief of police, recently requested the railway to instruct motormen to stop their cars so that the rear doors would open on the safety zones that have been lined off in the business district, and also that when the doors of cars are once closed and the motorman is signalled to go, the car be not stopped to let any other person board it or for other reasons except grave emergency. The Council has been waging an intensive campaign against reckless auto driving. It announced that one of the first evils to be eliminated is the passing of street cars by autos while the cars are discharging or taking on passengers.

## St. Paul Fare Hearing Deferred

After a morning hearing before the Minnesota Railroad Warehouse Commission on July 28 the application of the St. Paul City Railway for an emergency fare of 7 cents and four tokens for a quarter, postponement was allowed to Aug. 23, the day set for the postponed hearing of the Minneapolis Street Railway's application for a similar emergency rate. Both cities now have a 6-cent rate.

The postponement was made on plea of Corporation Counsel Arthur E. Nelson that the city wanted time to analyze the company's exhibits and to prepare a brief. The counsel had already attacked the validity of the law, which was passed by the 1921 Legislature placing the rate-making power for electric railways in the commission. If the commission grants the rate this attack will be taken into the courts for determination of the constitutionality of the law.

E. W. Bemis is the expert retained by the city to support its side of the fare controversy. Mention of the postponement of the Minneapolis Street Railway's case was made in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 6.

## Points Before Court in Louisville Case

The City Attorney of Louisville, Ky., has announced the questions which have been certified to the Supreme Court of the United States by the Circuit Court of Appeals in the case of the City of Louisville in its appeal from the injunction obtained by the Louisville Railway restraining the city from interfering with it in the collection of 7-cent fares. According to him they are:

1. Whether the acts of the Kentucky Legislature prior to the present constitution gave the city power to contract for a rate of fare.
2. Whether the consolidation of the companies in 1890 abrogated the contract.
3. Whether the acceptance of the present constitution by the Louisville Railway abrogated the contract.

Attorney Lawton stated that these three questions will be certified to the Supreme Court as soon as it convenes in October. The questions other than those certified to the Supreme Court will be passed on by the Circuit Court.

Everybody concerned appears to be very well pleased with the action of the Circuit Court of Appeals in certifying to the United States Supreme Court the questions involved in the 7-cent fare suit of the city. It is pointed out that the case would have gone to the Supreme Court in any event and that by the action of the Circuit Court decision will be rendered more promptly and the procedure will be less expensive.

In the meantime the company continues to collect 7-cent fares and is issuing rebate slips for the additional 2 cents. It is anticipated that so far as the company is concerned it will benefit materially in earnings, even if the decision is against it.

A local newspaper has taken up the cudgels in defense of the railway, declaring:

> If the city should finally win, all those who will have paid 7 cents and have no means of recovery will remember that machine politics at the City Hall threw into the courts a matter that proper city administration should have handled in an administrative way. If the company should finally win, a way out will have been shown to all utilities subjected to political persecution.

## Routes of New Five-Cent Lines Announced

Edward Dana, general manager of the Boston (Mass.) Elevated Railway, has announced that additional experimental districts with 5-cent local fares, without transfer privileges, will be operated commencing Aug. 13. In Charlestown, all surface cars will be operated to Brattle Street station, it is stated, the local 5-cent fare to be collected pay-enter inbound and pay-leave outbound. Ten-cent fares will be collected from passengers transferring to elevated or Haymarket Square subway stations.

In Cambridge, surface cars operated to the Harvard Square subway station, lower level, will be run pay-leave inbound and pay-enter outbound. Local fares will be 5 cents, without transfer privilege. Inbound 10-cent through fares will be collected at Harvard Square subway station.

Dorchester inbound passengers riding to Andrew Square, Eggleston Square or Dudley Street, east loop or lower level, will pay 10-cent fare, and if alighting before arrival at the station will be entitled to a return coupon, good on outbound cars only on the date issued and the next day. Outbound 5-cent local fare or return coupon will be collected without privilege of transfer.

No change will be made on night and early morning cars.

## Eight Cents in Birmingham

Eight-cent fares with a 2-cent transfer charge were granted the Birmingham Railway, Light & Power Company by the Alabama Public Service Commission in an order made public on July 31. The increased fares took effect on Aug. 2.

Plans for a fight against the increased rates granted by the Public Service Commission and an attack upon the constitutionality of the Public Utilities Act of the last Legislature of Alabama, which gives the Public Service Commission complete and exclusive control of the rates charged by all public utilities, are being discussed by the City Commission of Birmingham.

Tickets, according to the terms of the order of the commission, are being sold at a rate of fifteen for $1, or at 6⅔ cents each for a minimum of fifteen tickets. Stations for the sale of these tickets have been established by the company throughout the business district, and the first day of the sale several thousand people purchased tickets. By the use of tickets, where no transfer is made, regular riders secure a reduction of one-third of a cent a ride under the new rates, a 7-cent fare having been in effect for several months.

The 2-cent transfer charge applies on all transfers except from several lines which are in effect extensions of main lines. In these specific cases the transfers are issued without charge, and riders are entitled to a further transfer to other lines on the payment of the regular 2-cent charge.

### Reduced Rates to Win Patrons

Announcement has been made of a restoration of reduced round-trip fares over a large portion of the Oregon Electric Railway lines in the Willamette Valley, and on the Spokane, Portland & Seattle line to lower Columbia River points. The new schedule is aimed at competing auto-bus lines and has been established in an effort to restore the passenger traffic to its former basis. The new rates, which include one-day round-trip fares and week-end round-trip fares, became effective July 14 and July 16 respectively. They have been announced to expire Sept. 30, 1921, unless cancelled or extended.

The new rates for the week-end round-trip tickets are approximately 25 per cent lower than the present rates. The one-day round-trip tickets are 15 per cent under the present rate. The new rates are for round trips only and have no effect upon one-way service.

### "Pull Together" Campaign Successful

"Let's Pull Together," is the slogan in bold face type on cards recently handed to passengers on lines out of Camden by the conductors in the employ of the Public Service Railway. The appeal continues with:

> Boost for better car service.
>
> We appreciate your patronage and support.
>
> We want to give you the best trolley service that is possible.
>
> We conductors and motormen are anxious to please you.
>
> We want better feeling and closer understanding between you and us.
>
> We want to ask you for suggestions as to how we can serve you better.
>
> We want to send you from time to time statements regarding our plans.
>
> We want the interest and good will of our car riders.

An urgent request follows for passengers to sign the cards and return them to a member of the crew.

The effort to enlist the co-operation of patrons has resulted in gratifying response. Up to Aug 8 9,524 names with addresses were turned in and many helpful comments were made. It is interesting to note that approximately 85 per cent of the persons who responded to the company's invitation lived in New Jersey and about one-third of these came from Camden. Most of the other persons signing cards lived in Philadelphia and other places in Pennsylvania. Only four signers made any complaint about the rate of fare. Some of the remarks were commendatory.

### Long Distance Limited Service Planned

The interurban service from Fort Wayne, Ind., is to be augmented by the establishment of the longest distance limited service in the country in a short time. The Wabash Valley flyer, which operates between Fort Wayne and Indianapolis, will be extended to take in Lima, Ohio, making a complete interstate run on limited time.

The route within a short time, officials say, will continue to Cleveland, Ohio, the present schedule being altered to make all connections. This will make Fort Wayne one of the leading traction centers of the country. The new line will be the only direct route connecting the Ohio cities and the Indiana capital. It is planned to establish the Lima-Cleveland service by Oct. 1.

The Lima road of the Ohio Electric Railway, under the receivership of Henry C. Paul, Fort Wayne, has been improved financially and physically. The Indiana Service Corporation is leasing part of the road from the receiver.

### Seattle Confident in Fight Against Jitneys

Following the decision of the State Supreme Court, in which the rights of the city to ban the jitneys from the street were upheld, Superintendent of Utilities Carl H. Reeves issued an order forbidding the operation of any jitneys in Seattle. From this ruling sixty-five drivers are protected as participants in the McGlothern suit. This action covers a petition for rehearing of the jitney case, in which a temporary injunction, until Aug. 20, has been issued. Forty-three other jitney drivers have been allowed to join the sixty-five now protected, but they will not be protected by the injunction that affects the original sixty-five.

Since the order by Superintendent Reeves, one jitney driver has been arrested and fined $25 for operating without a permit, and in the case of seventeen others arrested judgment has been suspended at the request of W. B. Crawford, attorney for the Sound Transit Company, the organization of drivers. Mr. Crawford contends that the men under arrest are entitled to the thirty-day immunity granted by the injunction to Mr. McGlothern and others.

In a court order issued by Chief Justice Fullerton of the Supreme Court the forty-three drivers are permitted to join with the original sixty-five in filing a petition for a rehearing and a motion for modification of the court order issued by the Supreme Court on July 22.

About 120 jitneys have been barred from the streets by the order of Mr. Reeves. The ousting of the jitneys is believed by city officials to be the beginning of the end of the city's long fight to prevent the jitneys from competing with the Municipal Railway.

Several applications have been filed with the City Council for permits to operate 5-cent "feeder line jitneys" from the end of the railway lines. Mr. Reeves favors granting such feeder line permits in reasonable numbers.

**Suburban Fares Reduced.**—E. G. Shoup of the Peninsular Railway, San Jose, Cal., recently announced lower fares to the suburbs. The cuts are from San Jose to Los Gatos, round trip from 52 cents to 40 cents; San Jose to Campbell from 30 cents to 24 cents; from San Jose to Saratoga from 52 cents to 40 cents.

## Court Reverses Itself

### Emergency Rate Allowed In Evening Rescinded Next Morning—Everybody Wondering

Judge John Rellstab of the United States Court at Trenton, N. J., issued an order on the afternoon of Aug. 9 authorizing the Public Service Railway to increase its fare from 7 to 8 cents, with 2 cents for a transfer. On the morning of Aug. 10 the judge rescinded that part of his order permitting the increase to become effective.

Judge Rellstab's latest order states that "after further reflection upon the consideration of the authorities and in view that an early date for the hearing has been set in this case, so much of the rule to show cause which authorizes the company to increase its fares is vacated."

Application for a preliminary injunction to restrain the Public Utility Commission from interfering with the collection of a rate of fare greater than the 7-cent rate with 2 cents for transfers authorized by the commission was made to Judge Rellstab by the Public Service Railway on Aug. 9 under the provisions of an act of Congress passed in 1911.

Counsel for the company convinced Judge Rellstab that a condition existed which would result in confiscation of the company's property, and the advanced rate was granted, to become effective when the company had filed stipulations providing for a refund of the excess fare in the event that the appeal was finally determined so as to provide for a rate of fare less than 8 cents.

The recital of the bill by the railway is in a large measure a reiteration of statements already made before the Public Utilities Commission and the courts in previous rate cases. Statements of the commission that the rate allowed by the board will provide a 7 per cent return on the value of the company's property are branded in the bill as palpably incorrect.

Under Section 266 of the Federal Judiciary Act three judges must hear the appeal. The date has been set as Aug. 18 and Judge Rellstab has selected Judge J. W. Davis of New Jersey and Victor Wooley of the Delaware Circuit Court to sit with him.

Governor Edwards said that it was difficult for him to understand why the railway did not exhaust its logical resources in the State before taking its case to the Federal Courts.

Counsel for the New Jersey Auto Bus Owners' Association said that the only solution was to let the railway charge all it desired and let the people choose between it and the jitneys.

The commissioners were away from the State on a short vacation when the court announced its ruling. Mr. Herrmann, counsel for the commission, said, however, that from the little information he had, he doubted the legality of Judge Rellstab's act. This statement by Mr. Herrmann was made before the supplemental order of the court had been announced.

## 24,343,493 Jitney Passengers in Newark in Six Months

During the first half of this year the jitneys in Newark, N. J., carried 24,343,493 passengers, compared with 19,625,797 for the first half of 1920. The report of the Department of Revenues and Finance disclosed that jitney owners collected fares aggregating $1,217,171 this year against $981,289 for a similar period last year. The figures show that approximately the same number of buses were operated during each of the competitive periods.

## Wheeling Company Acts Against Buses

Exciting scenes resulted on July 30 when C. P. Billings, general manager of the Wheeling Traction Company, had warrants issued for the drivers of the buses operating between Wheeling and Bellaire, Ohio, and Martins Ferry, Ohio. Mr. Billings charged the operators of the buses with violating the new state traffic ordinance by failure to pay license. The drivers were arrested, and after being freed on bond the men ran the buses, giving free rides. It later developed, however, that the statute under which the arrests were made did not become effective until Aug. 9.

Mobs gathered where the drivers were arrested and threatened the constable making the arrests. Later, at Aetnaville, Ohio, parts of the railway tracks were torn up, and in Martins Ferry, just above Aetnaville, the tracks were greased. The traction system was tied up.

There was a riot when Mr. Billings appeared in Bridgeport in response to reports street cars were being interfered with. So threatening did the attitude become against him that the police felt called upon to protect him from the mob.

The trouble was the climax of the fight between the traction company and the bus lines which are springing up on all sides in competition with the trolley. Recently the Wheeling City Council passed an ordinance restricting the bus lines.

## Jitney Measure Modified—Property Consents Now Necessary

The first ordinance regulating jitney traffic in Kansas City, Mo., became effective on April 16. It prohibited jitneys from using streets on which street cars operated. The second regulatory ordinance was passed by the City Council on July 11, was signed by the Mayor on July 13. It becomes effective on Aug. 12. This second ordinance represents a response of the city to the demands of the public that consent of property owners be secured before jitney routes are established.

The new ordinance provides that written consent of a majority of front feet property owners on proposed jitney routes shall be filed before such proposed route can be established. The majority is of front feet, and the property owners signing must reside in Kansas City. There are other restrictions on routing. A route so established may be maintained for one year; the license continuing unless withdrawals of consent by property owners shall reduce the consent-footage below a majority.

The type and number of jitneys to be operated are under control of the inspector of jitneys—no more than those designated in the application and approved, to be allowed on any route.

The new measure is in the nature of an amendment to the previous ordinance and continues in effect the ruling that autos for public hire in so-called jitney service shall not be operated on streets where railway facilities are provided.

## Commission Issues Jitney Certificate

The first jitney certificate was issued by the Maine Public Utilities Commission recently to Packard & Dunbar for the operation of a bus line between Grennville and Lily Bay, and from Greenville to Bangor. By a new law the Public Utilities Commission took over the supervision of the jitney, which is in charge of G. R. Armstrong, the commission's expert electrician.

According to rules and regulations adopted, time and fare schedules must be posted in the bus, and passenger capacity cannot be exceeded. The fare between any two points must not be less than the fare charged by any steam or electric carrier. Licenses can be revocated at any time after a hearing when it is shown that the public good no longer requires the jitney service or when rules have been violated.

## Jitneys Banned in Albany

Pending a decision on the application of the United Traction Company, Albany, N. Y., for a permanent injunction, jitney operators have been restrained from competing with the railway. The order curbing the jitneys was made by Supreme Court Justice Harold J. Hinman of the Third Judicial District, New York State. It specifies by name 211 jitney men who have been running buses for hire without securing certificates of "necessity and convenience" from the Public Service Commission. The order is returnable on Sept. 10, when the railway case will be argued. The company has until Aug. 19 to serve the injunction. Those not mentioned in the injunction may continue the operation of buses until enjoined.

The company contends through H. B. Weatherwax, the vice-president, that jitneys have been operating in Albany, Troy, Watervliet and Cohoes in violation of Section 26 of the transportation law. The buses have been doing a good business in the cities affected by the strike of the union employees of the railway now in its seventh month. The company's cars are now being operated by non-union employees.

## Low Fare Experiment Abandoned

A low rate of fare for a limited zone in the down-town district of the city does not stimulate the riding habit. That is the conclusion of officials of the Cleveland (Ohio) Railway, who on Aug. 8 discontinued the experiment of charging only 3 cents cash for fare, with a 2½-cent ticket rate, in the down-town part of Cleveland. The plan had a thirty-day test, but proved a failure. Instead of stimulating the riding habit and thus bolstering up the falling receipts of the company, the plan turned out to be a losing venture.

Starting on Aug. 9, a ride in the down-town section of Cleveland costs the same as a ride any place else; namely, 6 cents and a 1-cent charge for transfer, with nine tickets for 50 cents and 1 cent for each transfer.

The failure of the plan was discouraging to officials of the railway and to Fielder Sanders, city street railway commissioner, who had hoped that it would mean increased revenue to the company.

In commenting upon the failure of the plan, the Cleveland Plain Dealer on Aug. 7 said in an editorial:

> The down-town low fare experiment has proved a failure and comes to an end tomorrow. The idea was that if people could ride within a restricted area in the congested section at a reduced rate fewer would walk these short distances and a profitable short haul business might be built up. But the public failed to respond, people continue to walk about the down-town section and the company finds the experiment a losing one.
>
> While the general results of the test are not to be questioned they are disappointing in their relation to two car lines confined wholly to the congested area. There should be some plan possible for keeping a reduced fare in force on the Union station line and the pier line.
>
> Here are the cars with which Cleveland meets its visitors. Six cents seems unnecessarily high for a ride from the station to the Square or to one of the downtown hotels. Six cents is too much to charge passengers riding from the foot of East Ninth Street to the Square. Such a charge gives the stranger an unpleasant impression that the city is inhospitable.
>
> It is taken for granted, of course, that with a reduced fare on these two lines no transfers could be issued. The average traveler from station to hotel wants no transfer. Those who do wish to take some other line from the Square would not object to paying the higher fare and the transfer charge in addition.
>
> The pier line used to carry passengers for 1 cent. That was probably too low, but somewhere between 1 cent and the present 6-cent charge it ought to be possible to find a figure at which passengers could be carried at a profit reasonable but not excessive. The same considerations hold for the Union station line.

## Six Cents Predominant Fare in Ohio

Figures compiled by the Ohio Committee on Public Utility Information on fares in effect in twenty-three Ohio cities having a population of more than 14,000 each show that 6 cents is the prevailing car fare in that State.

Of the twenty-three cities eleven have a 6-cent fare, while four charge 7 and four 8 cents. In Cincinnati and Youngstown a 9-cent rate is in effect, while Tiffin charges 10 cents.

A report of the Ohio Public Utilities Commission recently published showed that the interurban railways of Ohio operated at a loss during 1920.

## Decision Reversed in Connecticut Jitney Case

Judge Edwin S. Thomas of the Federal Court at New Haven rescinded on Aug. 8 his restraining order of July 30 and gave notice that the jitneys would have to cease operating at 12 o'clock that night. The ruling of the court is that the jitneys must not attempt to operate again until the Federal Court of three judges had passed upon the application of the jitney men for an interlocutory injunction.

The court pointed out that there was no good claim to the theory of the jitney men that the court having issued a restraining order has not the power to vacate or modify its ruling. The court found that the rights of the plaintiff as set up were not free from doubt. As to the main issue, namely, the constitutionality of the state law, Judge Thomas left that to the higher court, which is to sit at New Haven on Aug. 16. The court was not convinced that the injury to the jitneymen would be irreparable if they were compelled to stop operating.

Judge Thomas had on July 30 issued an injunction which temporarily terminated the jitney ban and prevented the police from making arrests. In this decision Judge Thomas overruled Judge Keeler of the Superior Court, who had previously refused to issue an injunction to prevent the police from interfering with the jitneymen.

George D. Watrous, who appeared in behalf of the Connecticut Company, at a hearing on Aug. 5, pointed out that the company was losing from $6,000 to $10,000 daily as the result of jitney competition.

## Transportation News Notes

**Authorize Ten-Cent Rate.**—The State Railroad Commission of Montana has granted the application of the Butte Electric Railway for a cash fare of 10 cents. Commutation tickets at 6¼ cents in books of any multiple of four will be provided under the board's ruling.

**Pennsylvania Line Cuts Rates.**—The Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., has filed notice with the Public Service Commission of decrease in its rate for agricultural and other lime and also for various kinds of shipments in smaller lots.

**Seven-Cent Fare Only Allowed.**—The City Council of Somerset, Ky., has authorized the Kentucky Utilities Company to collect a 7-cent fare in that city. The company asked for a 10-cent fare, stating that it could not operate for less. The company has not announced whether it will accept the Council's offer and resume the operation of cars.

**Interurban Rates Advanced.** — Cash fare, round-trip and commutation rates on the interurban lines of the Denver (Col.) Tramway were increased 20 per cent on Aug. 1 by authority of the Colorado Public Utilities Commission. The order further provides for a minimum cash fare of 10 cents and a minimum round-trip fare of 25 cents.

**Freight Service Established.**—A new traction freight service between Fort Wayne, Ind., and Lima, Ohio, was started by the Indiana Service Corporation on Aug. 1. The object of the new service is to enable Fort Wayne shippers to send freight over this line one day and have it distributed out of Lima to western Ohio points the next day.

**Première of Snapshots.**—An interesting illustrated newspaper "snapshots" giving sidelights on the employees during the busy day and in off moments is being published by the Georgia Railway & Power Company, Atlanta, Ga. It appeared for the first time on July 23 and will hereafter be published on the second and fourth Saturdays of each month.

**Wanted — Uniforms to Press.** — To co-operate with the men in maintaining neat appearances the Los Angeles (Cal.) Railway will operate its own uniform department in the near future. "Two Bells," the official publication of the railway, announces that Clayton C. Beers will be appointed superintendent of this department. A feature of special interest will be the cleaning and pressing service.

**"Partners" To Appear Semi-Monthly.** —*Partners*, the official publication of the Dallas (Tex.) Railway, has grown in size and in numbers. It was announced in the Aug. 1 issue that *Partners* would be published semi-monthly instead of monthly "so that employees might have the news while it is hot." The editor announces that the former policy will be continued; i.e., constructive criticism and descriptive articles. New features will be added.

**Lower Rates in Effect.**—A reduced fare schedule on the Connecticut Company's line between Rockville and Hartford went into effect recently. The new fare will be 30 cents while the interurban line rate will remain at 40 cents. It is believed that the Common Council of Rockville will secure permission for a 20-cent fare between Rockville and Crystal Lake. The present fare is 30 cents.

**Prepared to Submit Data.**—Armed with information regarding legislation and regulation of jitney traffic in western cities, members of the Indianapolis City Council who accompanied the jitney junketing party have returned prepared to submit to the Council recommendations designed to clear up the jitney situations in Indianapolis. Investigation of conditions was made in Sioux City and Des Moines, Ia., and Kansas City, Mo.

**City Fights Fare Rise.**—Charles L. Jewett, head of the city law department of New Albany, Ind., appeared before the Interstate Commerce Commission in Washington to submit oral arguments in protest of the advance in fare from 7 cents to 10 cents, effective Oct. 1, by the Louisville & Northern Railway & Light Company, which operates the "Daisy" line between New Albany and Louisville. Last January the commission made a tentative award of an 8-cent commutation fare and a 10-cent cash fare, whereupon the company filed exceptions.

**Allows Eight-Cent Rate.** — Under a recent ruling of the Public Service Commission the Hudson Valley Railway has been authorized to put an 8-cent fare into effect between points in and through each zone except in Troy and in the urban zones of the cities of Saratoga Springs and Glens Falls. The company will also be permitted to increase the twelve and twenty-four-trip commutation tickets and forty-ride commutation ticket books good between Hudson Falls and Schuylerville, Glens Falls and Thomson and Glens Falls and Wilton may be advanced from $10 to $15.

**Surface Lines Hearing Deferred.**—Hearing of the Chicago (Ill.) Surface Lines fare case has been deferred until Sept. 14. At a session before the Illinois Commerce Commission on July 27 State Attorney Crowe renewed his demand for the corporate books of the companies. Counsel for the Surface Lines said he recognized the authority of the commission to examine all books, but he objected to anyone else claiming this as a right. It was agreed that this matter would be taken up when the hearings begin.

**Would Couple Wages With Fares.**—As soon as the announcement had been made that the wages of the trainmen and other employees of the International Railway, Buffalo, N. Y., would be reduced, Frank C. Perkins, commissioner of public affairs, asked the City Council to apply to the Public Service Commission for a rehearing on the fare case. Corporation Counsel Rann opposed such a move, holding the time was inopportune for a rate case and that the city might lose such a proceeding in view of the financial condition of the railway. The reduction in wages was noted in last week's issue.

**Government Utilizes Traction Cars.** —Traction cars of the Louisville & Southern Indiana Company and the Louisville & Northern Lighting & Power Company are being utilized for transporting the United States mails, as the result of an agreement which has just gone into effect with the Post Office Department. The transportation of the mails has hitherto rested solely with steam trains between Louisville, New Albany and Jeffersonville. The new arrangement offers a speedier service, cutting down the time by a half day. Mail from New Albany to Indianapolis will be carried to Jeffersonville by electric railway cars in time to catch the afternoon train to Indianapolis.

# Legal Notes

CALIFORNIA—*Assault by Employee on Passenger Who Had Left the Car.*

A passenger who had had an altercation with the conductor over the question of a transfer was assaulted by the motorman after he had left the car. The court held that it was not a prerequisite to the right to recover that the passenger relation should be established, provided the employee was acting with the scope of his employment. [Galloway vs. United Railroads, 197 Pacific Rep., 663.]

FEDERAL DISTRICT COURT—*Carrier of Passengers Must Pay for Examination of Baggage on Sundays and Holidays*

The ruling of the Treasury Department requiring baggage brought in by trolley car passengers on Sundays and holidays to be impounded for inspection on the next working day, unless the trolley company pays the extra compensation for inspection, is a reasonable exercise of the department's power to make regulations for the enforcement of Rev. St. Sec. 3100, and the court cannot substitute its judgment for his. [International Railway vs. Davidson, Collector of Customs, 271 Federal Rep., 313.]

FEDERAL SUPREME COURT—*A State May Tax a Railway Franchise of a Company Engaged in Interstate Commerce.*

A company owned 0.865 mile of track on the Eads bridge over the Mississippi and the Missouri State Board of Equalization taxed the 0.346 mile of track in the state on the basis of value per mile of $537,630, made up as follows: Rolling stock, poles, wires and cash, $32,630; roadbed, $5,000, and "all other property," $500,000. The company claimed this last item consisted of its franchise to conduct interstate passenger traffic and that such taxation was unconstitutional. The court held, however, that this value was not merely a franchise to do an interstate business, but the company's exclusive right to operate over the bridge, as well as the connections which it had with railways, at the end of the bridge, and as the company was capitalized at $1,000,000 and paid a return thereon, it was proper for the state to impose an ordinary property tax upon property having a situs within its territory. [St. Louis & East St. Louis Electric Railway vs. State of Missouri, 41 Supreme Court Rep., 488.]

GEORGIA—*Rule of Comparative Negligence Stated.*

The law in Georgia gives a right of recovery to an injured party although his own negligence may have been a contributing cause of the injury, provided the defendant's negligence constituting the proximate cause of the injury is greater than that of the plaintiff; the damage to be diminished in accordance with the plaintiff's contributing negligence. [Fairburn and Atlanta Railway & Electric Company vs. Latham, 107 Southeastern Rep., 88, and Georgia Railway & Power Company vs. Reid, 107 Southeastern Rep., 100.]

INDIANA—*The Driver of a School Wagon is an Agent of the Parent So That His Negilgence Will Be a Bar to Recovery for a Child's Death at a Crossing.*

The driver of the wagon, which is furnished by the township trustees to transport children to school under a statute which requires the trustees to furnish a wagon but does not require a parent to avail himself of the means so furnished, is the agent of a parent who intrusts his child to the driver for transportation. Hence the contributory negligence of the driver in crossing a railway track bars the parent's right to recover for the child's death from injury in a collision. [Union Traction Company of Indiana vs. Gault, 130 Northeastern Rep., 136.]

IOWA—*Alleged Oral Promises and Representations Held Not to Invalidate Contract for Right-of-Way.*

A property owner agreed to convey to the public for highway purposes 10 ft. in width of his lot to enable an electric railway company to build its tracks, but after the road was constructed he claimed that the oral promises of the company's agent in regard to the type of ballast to be used, stops to be made by the cars, etc., were not carried out, and that the contract should be declared invalid. The court held, however, that definite contracts should not be treated lightly, and that the claims made did not constitute evidence of fraud. [Smith vs. Waterloo C. F. & N. Ry., 182 Northwest Rep., 890.]

MASSACHUSETTS—*Failure of Conductor to Assist Passenger Held Not Negligence.*

The failure of the conductor to assist a woman passenger who had a child in her arms to alight from the car does not, in the absence of any showing of a rule or custom in that respect or of a request by the passenger for assistance, show negligence authorizing recovery for injuries caused by the passenger's falling. [Gatchell vs. Boston Elevated Railway, 130 Northeastern Rep., 94.]

MASSACHUSETTS—*A Truck Owner Who Uses Part of Street Reserved for Electric Cars Must Protect Himself Against Collision.*

A motor truck in winter, when there was deep snow on the highway, was traveling on the track of the electric railway which though on the street was on its southerly side and separated from the traveled way by a guard fence and was not paved. The truck broke down and while it was thus stalled a car ran into it. There was no red light on the back of the truck. Two employees of the railway company who were injured brought suit for damages against the truck owner. The company also sued for damages to its car and the Supreme Court upheld the verdicts for the plaintiffs in all three suits. [Bay State Street Railway vs. McCormick, 129 Northeastern Rep., 598.]

MINNESOTA—*Release May Be Voided for Mutual Mistake.*

A release from all damages arising from an accident may be voided if there is clear proof of mutual mistake as to an unknown injury caused by the accident, existing at the time of the settlement and not intended to be included therein. [Nygard vs. Minneapolis St. Ry. Co., 179 Northwestern Rep., 642.]

NEW YORK—*Complaint by Railway Held to State Cause for Injunction Against Operation of Motor Bus Routes.*

Complaint by a street railroad company in New York City to enjoin the operation of motor bus routes attempted to be authorized by the board of estimate and apportionment, was held to state a cause of action for injunction. [Brooklyn City Railway vs. Whalen, 229 New York Supp., 570.]

NEW YORK—*Right of Street Railway to Charge Two Fares Not Affected by Acts of Lessee, Annexation or Consolidation.*

A street railway, on termination of its lease of a line on which it had right under its charters to charge two fares, resumes possession with such right unaffected by the fact that its lessee had voluntarily charged only one fare thereon. If originally it extended through a city and a town, and under its franchises had a right to collect a 5-cent fare in each, such right was not affected by the annexation of the town to the city, or by the subsequent consolidation of the city with another city. [People ex rel. Brooklyn City R. Co. vs. Nixon et al., 184 N. Y. Supplement, 369.]

WISCONSIN—*Power of Cities to Require Railways Operating Over Right-of-Way to Move Tracks Is Limited.*

An interurban railway which owns the portion of the street on which its tracks are situated, subject to the right of the public to use it for highway purposes, is in a different position from a company operating on a public highway. To require it to move from its present location to other property on which it has no property rights would amount to taking away the property right that it now has. Cities under the general charter laws, section 925-52, subdivision 31, or 925-52, subdivision 51, do not have the power to require a company to move its track under such conditions. [State ex rel. City of West Allis vs. Milwaukee Light, Heat & Traction Co., 180 Northwestern Rep., 938.]

# Personal Mention

## I. C. C. and Shipping Board Have Joint Committee

Commissioner Charles C. McChord has been selected chairman of the joint committee composed of three members of the Interstate Commerce Commission and the United States Shipping Board which has been appointed for the purpose of providing a liason between the two governmental bodies and considering overlapping duties of the board and the commission due to amendments to the Interstate Commerce Act and the passage of the Merchant Marine Act.

The joint committee is at present considering the question of a uniform through export bill of lading but so far no final conclusions on the matter have been reached. Chairman McChord said on July 30 that this subject will be taken up again at another meeting which he plans to call later, although no definite date for it has been determined upon.

Members of the committee in addition to Chairman McChord are Commissioners Hall and Esch representing the I. C. C. and Commissioners Edward C. Plummer, Frederick I. Thompson, and Meyer Lissner representing the shipping board.

## Changes on Kankakee Interurban

Edward J. Blair, formerly assistant to the president, Chicago & Interurban Traction Company, which connects Chicago with Kankakee, Ill., was elected vice-president of the company at the meeting of the directors on July 22. W. W. O'Toole, formerly assistant auditor, was elected auditor. A. G. Nelson was made assistant secretary and assistant treasurer Other officers re-elected were Samuel Insull, chairman of the board of directors, Britton I. Budd, president, and W. W. Crawford, secretary and treasurer. Samuel Insull and W. W. Crawford were elected directors for a term of three years at a meeting of the stockholders held on the same day.

**C. D. Emmons**, president of the United Railways & Electric Company, Baltimore, Md., and H. B. Flowers, second vice-president and general manager of that company, expect to sail, on Aug. 13, for Europe, where they will study more particularly the use of trackless trolleys and the bus.

**J. G. Phillips** has resigned as general superintendent of the Mobile Light & Railroad Company, Mobile, Ala. Mr. Phillips was previously general manager of the Gary (Ind.) Street Railway. Prior to that connection he was engaged on valuation work with Ford, Bacon & Davis, engineers. At one time he was connected with the Hudson Valley Railway, Glens Falls, N. Y., as superintendent of rolling stock and later as assistant general manager. Mr. Phillips has not announced his future plans.

## Mr. Van Ness Made Manager

### Well-Known Electrical Engineer Will Direct Middle West Interurban for Receivers

The Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio, has undergone a reorganization of its personnel to the extent of the officials in charge of operations. L. G. Van Ness, one of the best-known electrical engineers in the Middle West, has been appointed general manager for the receivers, Edgar Stark and C. E. Hooven. Mr. Van Ness succeeds E. M. Gumpf, who resigned the general managership of the traction company some time ago, but who remained on the job until his successor took active charge. The railway has been in the hands of a receiver since 1913, but was apparently emerging from its financial troubles when the War Labor Board increased the pay of interurban and steam railroad employees.

F. E. Nichols, for many years connected with the General Electric Company, has been put in charge of operation of the road under the supervision of Mr. Van Ness, who has been a consulting engineer in Cincinnati for the last three years, with an office in the Union Trust Building.

Mr. Van Ness was graduated from the University of Wisconsin in 1896, and after leaving college served two years in the manufacturing field. From 1898 until 1904 he was employed as a consulting engineer by Emerson McMillan & Company, New York, operating the American Light & Traction Company. After severing his connection with this corporation, Mr. Van Ness joined the engineering staff of the North American Company.

During the year 1906, Mr. Van Ness went to Memphis, Tenn., where he supervised the construction of a light and power plant and remained on the grounds until the plant was in operation. He went to Cincinnati in the fall of 1918 and opened an office in the Union Trust Building.

Mr. Nichols is a graduate of the University of Kansas, and was an engineer in the employ of the General Electric Company from 1902 until last June.

Since Mr. Van Ness has taken charge the Cincinnati, Lawrenceburg & Aurora line has not undergone any material change in operation, but the new management has several plans under consideration to increase the earnings of the company, among them being the installation of a freight package system.

**T. T. Fitzpatrick**, who has been connected with the Monongahela Power & Railway Company, Fairmont, W. Va., for some time, has been appointed superintendent of transportation on the Clarksburg division. He succeeds Carl B. Johnson, resigned.

**A. W. Buckley** has been appointed superintendent of substations on the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. He has been with the company since Dec. 16, 1920. Before that Mr. Buckley was employed by the Indiana & Michigan Electric Company, South Bend, at the substations of that company which furnishes power for the Chicago, South Bend & Northern Indiana Railway.

**Brigadier General George H. Harries**, vice-president of H. M. Byllesby & Company, Chicago, Ill., who acted as chief of the allied commission in charge of prisoners of war in Germany after the armistice, has been decorated with the order of Leopold by the Belgian Ambassador, Baron deCartier, in recognition of his services in behalf of the Belgian prisoners. The ceremony took place on July 22, at the Belgian embassy in Washington in the presence of officers of the Belgian and American armies.

# Obituary

**Edward Carmin**, engineer at the Union Traction Company's power plant in North Anderson, Ind., was shot and instantly killed recently by George Ewen of Summitville, who had been employed about the power plant as a laborer and had been discharged by Carmin.

**George D. Munsing**, for several years manager of the old Consumer's Electric & Street Railway, now the Tampa Electric Company, at Tampa, Fla., died in Red Bank, N. J. Mr. Munsing came to Tampa in 1895 and was there until 1902, serving under both the Consumer's Electric Street Railway and the Tampa Electric Company.

**Hart A. Fisher**, formerly of Joliet, brother of F. E. Fisher, general manager of the Chicago, Ottawa & Peoria Railway Company, Ottawa, Ill., and a constructor and operator of steam and electric railroads, died recently in Crockett, Texas. He came to Joliet in 1903 from Columbus, Ohio, where he had promoted and constructed three or four of the most successful interurban railways of that district. With his brother, F. E. Fisher, and his son, L. D. Fisher, he formed the Fisher Construction Company. This company promoted and built the Aurora, Plainfield & Joliet Railway and the Joliet & Eastern Railway. Prior to entering the field of electric railway development, Mr. Fisher was in steam railroad promotion and operation for many years. He was the builder of the Chicago, Peoria & St. Louis Railroad.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Improved Business Condition Coming

### Credit Conditions Show Evidences of Improvement and Return to Normal Level Should Come Soon

The United States is practically through the period of violent business disturbance which began in May, 1920, according to a review of business conditions by the National Bank of Commerce in New York. "We will from time to time have visible evidences of the distressing conditions through which the country has been passing," the review continues, "but these occurrences should be regarded not as indices to forward conditions but as relating to the past. The changes which have taken place have not as yet been recognized by the business public for two main reasons. The period of normal midsummer dullness now at hand has obscured the certain evidences of improvement and thorough comprehension of credit conditions is lacking.

"Failure to recognize the passing of the period of insufficient credit has resulted from lack of recognition of the fact that for a long time the credit shortage has been apparent rather than real and due in large part to the unsatisfactory character of some of the risks offered. There is now no bank credit available for operations designed to hold prices at fictitious levels. Orderly organized marketing, if fair, succeeds, but attempts to hold prices above the levels determined by international supply and demand are certain eventually to fail.

"The main requisite for a return toward normal conditions is the will to try for business on a level where it can be had. The period of general liquidation of the raw material markets of the United States has passed. Recent declines are due to conditions of supply and demand in specific lines. This is a normal condition. Wholesale prices of many classes of manufactures have been fully deflated. This is not true in all lines, but recent cuts in the price of steel and widespread reductions in wages indicate that adjustment in wholesale prices will not be long delayed. Price stabilization is, therefore, not far ahead."

## Electrification of the Japanese Railways

Japan intends electrifying the entire railroad system of the country, writes the ELECTRIC RAILWAY JOURNAL correspondent in Switzerland. A report from London is to the effect that German manufacturers of electrical machinery and appliances are already in the field endeavoring to secure orders. Of a total length of 12,000 km. of the Japanese railways only 95 km. have been electrified thus far. Work on the electrification of a line of 205 km. will be started at once. A large power station for this line is to be erected in the neighborhood of Yokohama and another one near Tokyo. The expenditure for these two stations will be about 60,000,000 yen. A special company has been formed for the purpose of financing the electrification of the railways.

## Fewer Idle Cars

Freight cars temporarily out of service due to the business depression totaled 555,168 on July 23, according to reports just received from the railroads of the United States by the car service division of the American Railway Association. This is a reduction of approximately 10,000 since July 15. In reaching this total, the car service division takes into account the total number of cars now in excess of current freight requirements as well as the number of cars now awaiting repairs above 7 per cent of the total. Officials of that organization believe that this percentage, while higher than the accepted maximum of the pre-war period, probably represents a better standard for present comparisons due to the difficult conditions respecting labor and materials during the past three years.

The surplus cars on July 23 numbered 350,772, which was a reduction of 21,278 cars compared with the total on July 15. This reduction was due principally to the increased demand in the central Western region for grain cars. Surplus box cars totaled 119,442, which was a decrease of 16,191 compared with the earlier date, while surplus coal cars were reduced 5,049 to a total of 168,568.

Cars in need of repairs on July 15 totaled 365,092, or 15.9 per cent of the cars on line compared with 354,611 or 15.4 per cent on July 1. Allowing for 7 per cent being normal, cars in need of repairs above normal totaled 204,396, which added to the total surplus means 555,168 cars out of service because of business conditions.

## Railroad Crossing Frogs Cheaper

A 15 per cent reduction in the price of manganese steel castings for Balkwill articulated cast manganese railroad crossings, effective after Aug. 1, has been made by the American Manganese Steel Company, who furnish the manganese castings to most of the railroad crossing makers of the United States. This is the second reduction this year, and it is hoped will stimulate buying badly needed crossings.

## Jamaica Proposes to Electrify Railway

The government of the island of Jamaica proposes to borrow from $6,000,000 to $7,000,000, it is reported, for taking over the electric railway and lighting system of Kingston and for electrifying the government-owned Jamaica railway, which extends 127 miles. American manufacturers are preparing to submit bids on the project, funds for which will probably be obtained in London, it is stated.

## Census Bureau Reports on Wire Production

### Figures Are Based Upon Returns from 117 Establishments as Compared with 99 Establishments in 1914

A preliminary statement of the 1920 census of manufactures with respect to wire drawing mills has been prepared by the Bureau of the Census, Department of Commerce. It consists of a detailed statement of the quantities and values of the various products manufactured during the year 1919.

CENSUS BUREAU'S SUMMARY CONCERNING THE WIRE INDUSTRY—1919

| | 1919 | | 1914 | |
|---|---|---|---|---|
| | No. of Establishments | Value of Products | No. of Establishments | Value of Products |
| Total | 117 | $409,058,300 | 99 | $172,600,500 |
| Wire mills | 66 | 162,151,200 | 54 | 81,841,000 |
| Iron and steel rolling mills, wire departments | 25 | 191,997,200 | 24 | |
| Brass and copper rolling mills, wire departments and other concerns | 20 | 54,909,900 | 21 | 90,759,500 |
| | Quantity | Value | Quantity | Value |
| Wire and manufactures of | ......... | $401,376,400 | ......... | $166,999,900 |
| Steel and iron | ......... | 264,778,000 | ......... | 116,215,500 |
| Plain wire, tons | 2,508,890 | ........... | 2,435,500 | ........... |
| For sale, tons | 592,430 | 58,756,500 | 459,900 | 22,316,800 |
| Consumed in works, tons | 1,916,460 | ........... | 1,975,600 | ........... |
| Galvanized wire, tons | 922,970 | ........... | | |
| For sale, tons | 343,000 | 32,383,500 | | |
| Consumed in works, tons | 579,970 | ........... | 374,480 | 15,949,500 |
| Other coated wire, tons | 83,730 | ........... | | |
| For sale, tons | 49,925 | 5,257,700 | | |
| Consumed in works, tons | 33,805 | ........... | | |
| Bare wire, tons | 193,370 | ........... | ......... | ........... |
| For sale, tons | 161,660 | 68,011,300 | 84,920 | 26,206,000 |
| Consumed in works, tons | 31,710 | ........... | ......... | ........... |
| Rubber insulated cable, *tons | 24,570 | 18,738,100 | | |
| Paper insulated cable, *tons | 20,200 | 11,451,400 | 48,390 | 15,709,300 |
| Insulated wire, *tons | 29,470 | 15,216,700 | | |
| Brass wire, pounds | 50,521,000 | 16,024,500 | 39,614,500 | 6,366,300 |

* Not including insulated wire and cable made in establishments purchasing the wire, value $84,216,900. Total production, 1919, rubber insulated cable, $39,386,900; paper insulated cable, $25,664,300; insulated wire, $64,571,900; aggregate, $129,623,100.

## Rolling Stock

**The Denver (Col.) Tramway** advises that it is not in the market for purchase of additional rolling stock at this time, as was intimated in these columns in an item in the July 28 issue.

**The Southwest Missouri Railroad, Webb City, Mo.,** has just placed an order for eight one-man safety cars with the National Safety Car & Equipment Company. The operating equipment will be furnished by the General Electric Company, and Cincinnati trucks will be used.

**The West Penn Railways, Connellsville, Pa.,** is equipping several cars for use on various branches of the system. Five new 700-type cars are under construction for the Coke Region division and ten double-truck passenger cars for the McKeesport division. The bodies of these cars are being built by the Cincinnati Car Company. Five double-end type 200 cars are also being built for the Kittanning division, the first of which will be shipped about Aug. 10.

**Massachusetts Northeastern Street Railway Company, Haverhill, Mass.,** advises that it has equipped all its cars with life guards and complete sander equipments. Twelve cars carry air-operated sanders and 133 have the mechanical type. Both the sanders and the life guards have been installed in accordance with the Department of Public Works order No. 300, it is stated.

**Detroit (Mich.) Municipal Railway,** mentioned in the issue of July 23 as ordering 100 Birney safety cars from J. G. Brill Company on May 4, states that delivery of twenty-five cars is to be made by Aug. 1; twenty-five more by Aug. 15; the third lot of twenty-five by Sept. 1, and the remained by Sept. 15. Half of the cars will be equipped with Westinghouse air brakes, DH-16, and half with General Electric brakes, CP-27. Fifty of the motors are likewise Westinghouse, No. 508 and the other fifty are General Electric, No. 264. Other equipment specified on the cars is the same as on the 100 safety cars previously described.

## Track and Roadway

**San Francisco-Oakland Terminal Railways, Oakland, Cal.,** is now engaged in the construction of 1,500 ft. of additional second track along Fourteenth Avenue. The track will be built with 70 lb. standard "T" rail. The cost is approximated at $15,300.

**Hydro-Electric Power Commission, Ontario, Can.,** will have construction work on the railways in Windsor started within a month, the hydro-radial by-law having been passed.

**Southern Indiana Gas & Electric Company, Evansville, Ind.,** is considering a proposal to move the tracks at Mesker Park in the western part of the city in order to facilitate the building of Little Cynthiana Road. The county commissioners have approved the plan.

**New Brunswick Power Company, St. John, N. B.,** is considering the expenditure of $150,000 on track construction during the current year.

**New York State Railways, Syracuse, N. Y.,** has agreed to do its share in the paving plan in Manlius Street, Cortland Avenue and Gifford Street. The railway's plea that it lacked the funds has held up this improvement for more than two years.

**North Carolina Public Service Company, Salisbury, N. C.,** is relaying its tracks on Harrison Street from Main to Fulton Streets. The track was torn up to permit grading work.

**Tulsa (Okla.) Street Railway,** announces that from May 31, 1918, to May 31 of this year it expended $181,025 in extensions of lines, construction of carhouse and office building, double-tracking and installing new cars. Work is now in progress on a $10,000 addition to the company's shops and upon repairing and double-tracking the Kendall division at a cost of $40,000.

**Brantford (Ont.) Municipal Railway,** has received approval from the City Council for the proposed extensions in Eagle Place and the North Ward.

**Scranton (Pa.) Railway,** must move its tracks to the center of the street in Dupont according to a recent opinion handed down by Judge Woodward. This expense together with the paving of the road will cost the railway a considerable sum of money.

**Knoxville Railway & Light Company, Knoxville, Tenn.,** is repairing and overhauling its line between Arlington and Fountain City. The president of the company has announced that a local construction company is doing extensive work for both the company and the city on the Burlington line, Park Street and the north end of Gay Street.

**Nashville Railway & Light Company, Nashville, Tenn.,** will discuss with the councilmen and city representatives the possible extension of the Buena Vista line from Twenty Third Avenue and McDaniel Street beyond the end of the bridge over the Hyde's Ferry Pike in Bordeaux, a distance of 1¼ miles.

## Power Houses, Shops and Buildings

**Los Angeles (Cal.) Railway** has received some of the electrical equipment for the new Vernon automatic substation and work has started on the foundation of the second substation, which will be located in Garvanza. The Vernon building will be 42 ft. by 52 ft. The 1,000-kw. synchronous converter to be installed is of Westinghouse design. The feeders and high-tension lines will cost an additional $20,000. It is planned to have power delivered Nov. 1.

**Portland Railway, Light & Power Company, Portland, Ore.,** has applied to the federal power commission for a preliminary permit for a proposed future addition to its Oak Grove project on Oak Grove Creek near the mouth of the Clackamas River, in Clackamas County, Ore. The development contemplates the construction of a low diversion dam in the Clackamas River and a tunnel or canal 4 miles long connecting with the Oak Grove conduit.

## Trade Notes

**Robert S. Hammond,** Pittsburgh district sales manager of Whiting Corporation, Harvey, Ill., manufacturer of cranes, foundry equipment and railroad specialties, has been transferred to the Chicago office in the same capacity.

**The Consolidated Electric Lamp Company, Inc., Danvers, Mass.,** has acquired the business of the Chicago Electric Lamp Company and will conduct its business of lamp distribution from the factory offices at Danvers.

**Pacific Clay Products Company, Los Angeles, Cal.,** will replace its plant at Los Nietos, Cal., for the manufacture of firebrick and other refractory products with a plant that will have an initial capacity of about 25,000 firebrick daily.

**Morrison & Risman, Inc.,** jobber and dealer in new and used track equipment, has moved its New York City office to 26 Cortland Street, with R. S. Maddocks in charge. The company's main office is at Buffalo, N. Y., with district offices also at Pittsburgh and Philadelphia.

**The Universal Crane Company, Cleveland, Ohio,** announces that the Allied Machinery Corporation of America, 51 Chambers Street, New York City, has been appointed its foreign representative in all countries except the United States and Canada.

**The Arrow Pump Company,** with general sales offices in the Buhl Building, Detroit, announces that it is now prepared to manufacture centrifugal and other rotating types of pumps in which there will be incorporated a unique design of packing gland with ring oiling principle.

**F. E. L. Whitesell** has been appointed New England representative of the Railway & Industrial Engineering Company, Greensburg, Pa., with offices at 136 Federal Street, Boston. Mr. Whitesell has been in the company's sales department for a number of years.

**The Triangle Conduit Company, Inc., 50 Columbia Heights, Brooklyn, N. Y.,** announces an organization change. Thomas H. Bibber becomes general manager of the company's Western business. Mr. Bibber will continue to handle the production and sale of Tri Cord, in addition to his new duties.

**The Crane Company, 636 South Michigan Avenue, Chicago,** manufacturer of power house specialties, has awarded contract for a new pipe and pipe-bending shop, with new warehouse adjoining, at Thirty-fourth Street and the Allegheny Valley Railroad, Pittsburgh. The new plant, it is stated, will cost about $800,000.

**Robert D. Black,** formerly assistant sales manager, Black & Decker Manufacturing Company, Baltimore, Md., has been made manager of the company's branch office at Philadelphia, 318 North Broad Street, succeeding W. C. Allen, who has been made a special factory representative with headquarters at the company's Cleveland office, 6225 Carnegie Avenue.

**The Mica Insulator Company,** held its annual sales convention at its works in Schenectady, New York, during the entire week of June 20, with representatives in attendance from New York, Cleveland, Cincinnati and Chicago. The convention was marked with great enthusiasm throughout and the consensus of opinion was that the future outlook for the mica insulation industry was very bright.

**Topping Brothers, 122 Chambers Street, New York City,** jobbers in railway track supplies and other heavy hardware, is having a new four-story and basement, reinforced-concrete warehouse and office erected on the 100-ft. x 125-ft. plot corner of Varick and Vandam Streets. The company plans to move into the new building, which will afford about 67,000 sq.ft. of floor space, before May 1 next.

## New Advertising Literature

**The Fitchburg (Mass.) Steam Engine Company** has issued a forty-page catalog covering its different types of steam engines.

**The Greenfield Tap & Die Corporation, Greenfield, Mass.,** is distributing catalog No. 46, covering its small tools and pipe tools.

**The Combustion Engineering Corporation, 43 Broad Street, New York City,** has put out a forty-one page pamphlet entitled "The Use of Powdered Fuel Under Steam Boilers."

**The Turner Brass Works, Sycamore, Ill.,** is distributing Bulletin No. 5 covering its "New Line" torches, and also a four-page leaflet describing the "Turner" gasoline-kerosene torch.

**The Hygrade Lamp Company, Salem, Mass.,** has issued a new standard price schedule book, in which it describes and illustrates its different types of incandescent lamps.

**The American Chamber of Commerce in London, 8 Waterloo Place,** has issued a year book for 1921 in which are listed the names and addresses and business classification of about 1,000 American and British firms including electrical manufacturers, interested in developing business between the two countries.

**Signals** — The Consolidated Car-Heating Company, Albany, N. Y., has issued bulletin No. 11-A, giving information in regard to its starting and stopping signals for single car and train operation, also information and catalog details of their signal light system, high-voltage buzzer system, high-voltage bells, push buttons, switches and electric couplers.

**Welding Material and Equipment** — The Wilson Welder & Metals Company, Brooklyn, N. Y., has issued Bulletins No. 100 and 101, together with a reprint from the *Iron Age*, describing the welding of a large tank car. Bulletin No. 100 describes the various grades of certified welding metal, and bulletin No. 101 describes their small lightweight portable welding instrument.

**The Electric Storage Battery Company, Philadelphia, Pa.,** has just issued bulletins Nos. 180 to 185 inclusive. These contain information and descriptions of the latest development in the Exide storage battery construction and describe their adaptability for use with electric trucks, tractors, mine and industrial storage battery locomotives, as well as in railway signal service. Bulletin No. 181 gives the operating characteristics of lead acid storage battery and contains much information of value to those responsible for the maintenance of this type of equipment.

**Cars and Car Equipment**—The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued an eighty-eight-page booklet describing the various types of electric cars now being used by numerous electric railway companies. This contains data as to the seating capacity, electricity, electrical and mechanical equipment, weights and dimensions of these cars, as well as operating characteristics of the various railways and halftones of the exteriors and floor plans for the various cars. This book should be of value to electric railway men contemplating the purchase of new cars.

# Why not Tackle the Old-Car Problem Now?

Every company would like to secure new cars, with all that modern equipment which makes faster schedules possible. Unfortunately, few can afford new cars even to take care of additional business, let alone to replace older types. Are you trying to do the best you can with what you've got?

## HIGHER SCHEDULE SPEEDS

### possible with very slight expense!

Every operator of hand-brake cars has been studying the various factors involved in obtaining faster schedules. Skip-stops, faster handling of passengers, as well as more rapid acceleration have all been given attention, but the value of more rapid retardation has been sometimes overlooked.

The rate of retardation has exactly the same value as acceleration in its effect on schedules. Increased acceleration requires new motor equipment, and more power—a higher rate of braking requires new brakes but no cost for power.

For a trifling sum, you can equip every car on your property with hand-brakes which will secure the maximum possible speed of braking that the weight of the car and adhesion of rail will give.

# Peacock Brakes

## Correct in Theory—Practical in Operation

**The Eccentric Drum**

Peacock Brakes have an eccentric chain-winding drum, which gives maximum speed of winding at the start, and maximum leverage at the end of the operation of setting the brakes. It is the quickest and most powerful acting hand-brake combination manufactured.

Sizes and gear ratios to suit all styles and weights of cars.

*Write us today for information on hand-brakes to secure best results on your cars.*

## National Brake Company

**890 Ellicott Square**
**Buffalo, N. Y.**

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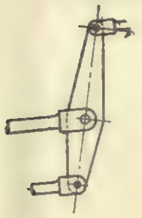

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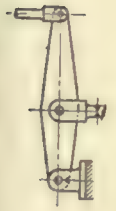

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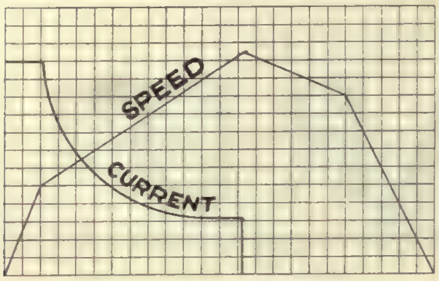

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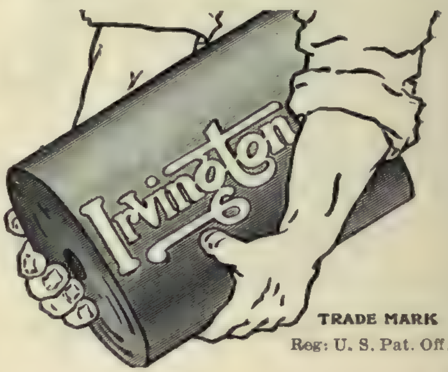

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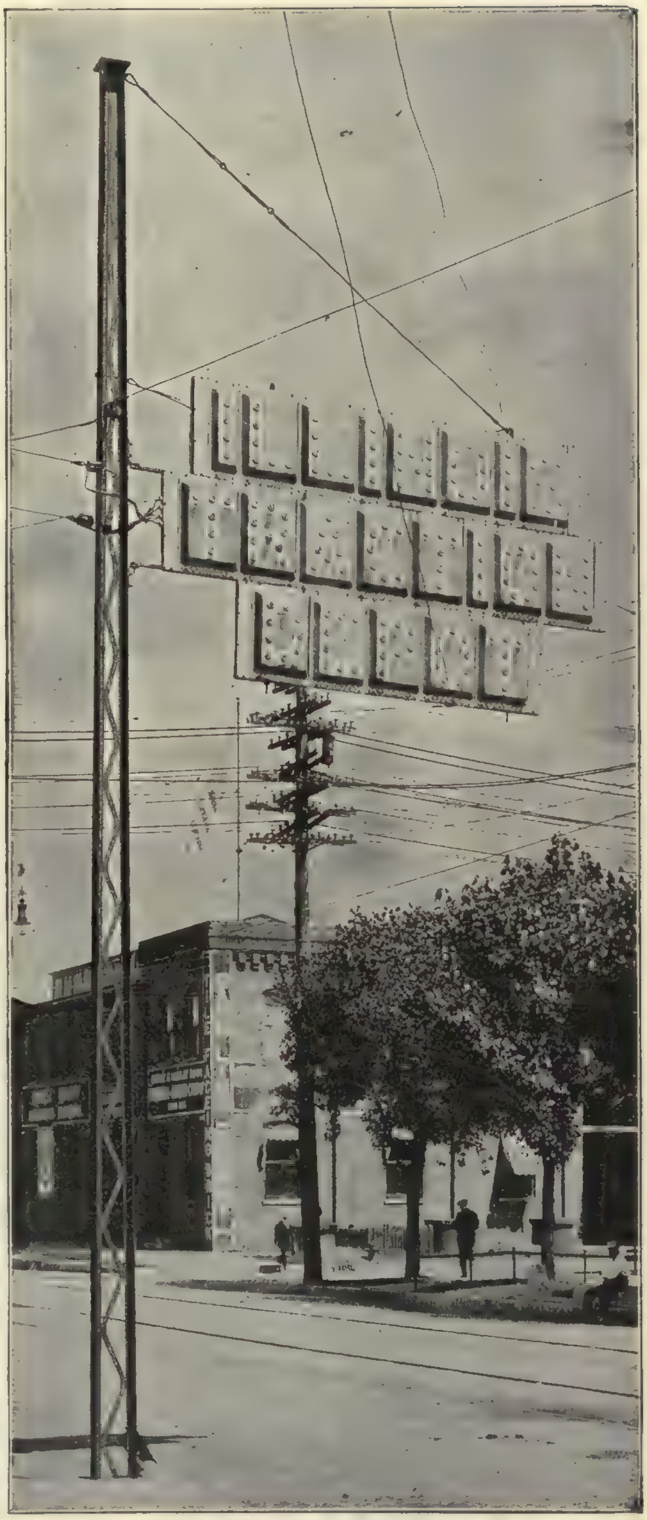

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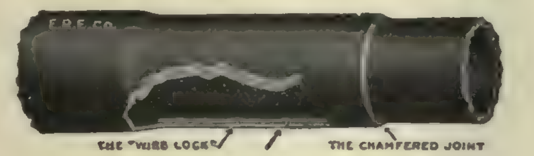

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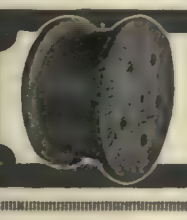

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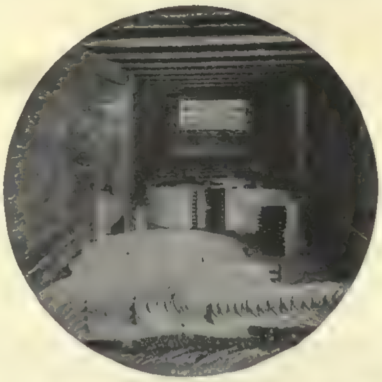

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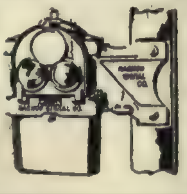

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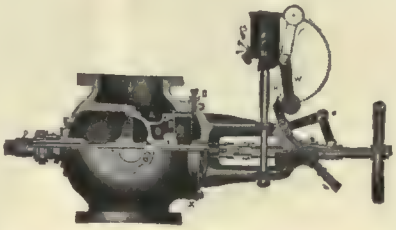

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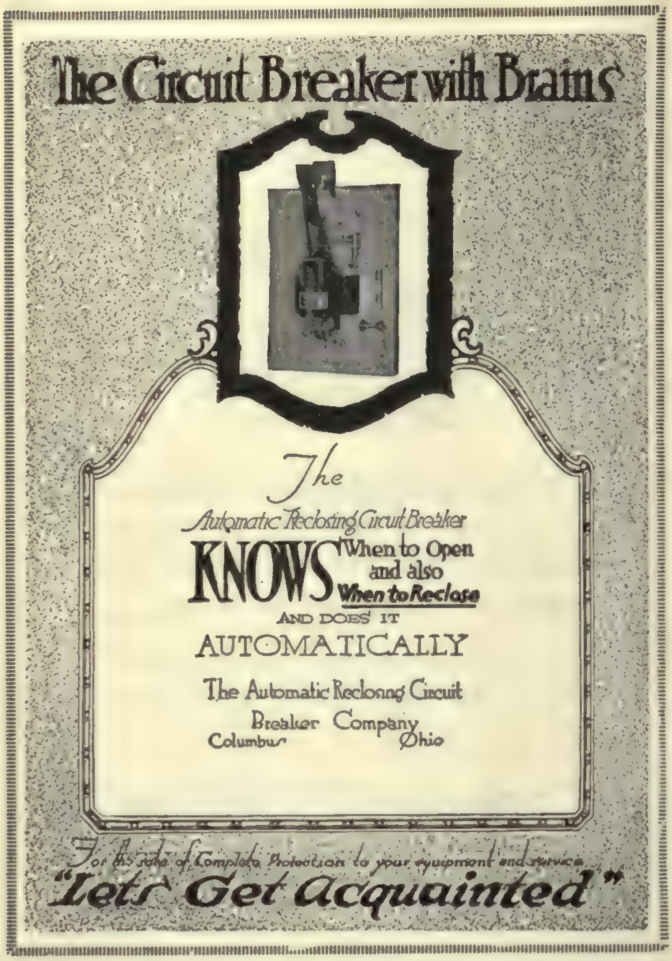

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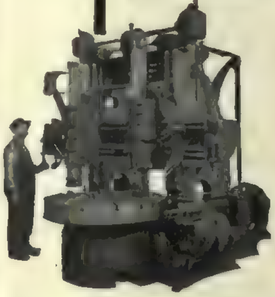

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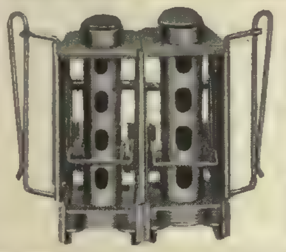
BLADES
GLADIUM CO. Inc. 34 Cliff St. New York



JOHNSON Universal Changer

**Adjustable**

The only changer on the market which can be adjusted by the conductor to throw out a varying number of coins, necessary to meet changes in rates of fares.

**Flexible**

Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

**JOHNSON FARE BOX COMPANY**
Ravenswood, Chicago, Ill.

Type R-10

**International Registers**

Made in various types and sizes to meet the requirements of service on street and city system.

Complete line of registers, counters and car fittings.

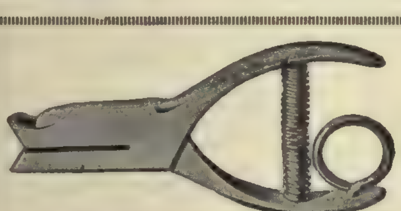
Exclusive selling agents for HEEREN ENAMEL BADGES.

**The International Register Co.**
15 South Throop Street, Chicago, Illinois

Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS
*Faster than the ticket seller*
Perey Manufacturing Co., Inc.
30 Church Street, New York City

Changes in your rate of fare NEVER entail additional fare box expenditure if you adopt the CLEVELAND.

**The Cleveland Fare Box Co.**
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario



Economical in the Long Run
BONNEY-VEHSLAGE TOOL CO.
Newark, N. J.

**Heating and Ventilating**

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

**The Cooper Heater Company**
Carlisle, Pa.

PS HEATERS

**Car Heating and Ventilation**
is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

**The Peter Smith Heater Company**
1725 Mt. Elliott Ave., Detroit, Mich.

ELECTRIC HEATER EQUIPMENTS

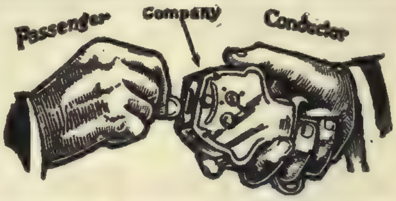
THERMOSTAT CONTROL EQUIPMENTS

Address All Communications to
BUSH TERMINAL
(220 36th St.)
Brooklyn, N. Y.
*Literature on Request*

**Car Seating, Broom and Snow Sweeper Rattan, Mouldings, etc.**
AMERICAN RATTAN & REED MFG. CO.
Brooklyn, N. Y.
AMERICAN MEANS QUALITY
RATTAN SUPPLIES OF EVERY DESCRIPTION

**HORNE MANUFACTURING CO.**
Mercer and Colgate Streets, Jersey City, N. J.

Hand Brakes—Air Purifiers for Compressors—Lighting Fixtures—Electric Vibrating Bells—Thermostats—Switches, Receptacles and Plugs—Junction Boxes, Portables and Reflectors.



Direct Automatic Registration By the Passengers
Rooke Automatic Register Co.
Providence, R. I.

**Electric car heaters—thermostatic control—pneumatic car door operators—buzzers, single-stroke bells, starting signal lights—special resistances.**

**CONSOLIDATED CAR HEATING CO.**
ALBANY, NEW YORK, CHICAGO

PROVIDENCE FENDERS H-B LIFE GUARDS
The Consolidated Car Fender Co., Providence, R. I.
Wendell & MacDuffie Co., 61 Broadway, New York
General Sales Agents

ELECTRIC RAILWAY JOURNAL

# Think "SEARCHLIGHT" First

## ADVERTISING RATES

**POSITIONS VACANT**—Business Opportunities and other undisplayed ads, 8 cents a word, minimum $2.00 an insertion.

**POSITIONS WANTED**—Evening work wanted, tutoring and other undisplayed ads of individuals looking for employment, 4 cents a word, minimum 75 cents, payable in advance.

**ADD 5 WORDS** for box number in undisplayed ads if replies are to any of our offices. There is no extra charge for forwarding replies.

**DISCOUNT OF 10%** if one payment is made in advance for 4 consecutive insertions of undisplayed ad.

**ADS IN DISPLAY TYPE**—Space is sold by the inch (30 in. to a page); the price depending upon total space used within a year, some space to be used each issue.

**RATE PER INCH** for ads in display space:

| | |
|---|---|
| 1 to 3 in., $4.50 an in. | 15 to 29 in., $3.90 an in. |
| 4 to 7 in., $4.30 an in. | 30 to 49 in., $3.80 an in. |
| 8 to 14 in., $4.10 an in. | 50 to 99 in., $3.70 an in. |

**POSITIONS VACANT** **POSITIONS WANTED**

# EMPLOYMENT

## POSITIONS VACANT

SUPERINTENDENT of transportation wanted, for electric street railway in Middle Western City operating twenty cars. Must be capable of dealing tactfully with obstinate labor situation. Reply, stating age, experience. references, and salary expected. P-927, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

WANTED office man with experience in railway accounting; must be able to also assist management in general handling of small property. Good salary paid. Evanston Railway Co., Evanston, Ill.

WANTED electrician, must be fully competent to handle motors, control and trolley troubles; good wages paid. Evanston Railway Co., Evanston, Ill.

WANTED; experienced inspector and supervisor for a street railway in middle western city of 40,000. $150. P-926, Elec. Ry. Jour. Old Colony Bldg., Chicago.

## POSITIONS WANTED

AUDITOR, 17 years with large railway properties open for position city or interurban lines. PW-925, Elec. Ry. Journ., Leader News Bldg., Cleveland, O.

COMPETENT operating official desires interview with owners of any property seeking new manager; twenty years experience in city and interurban service; familiar with valuation and rate cases. PW-929, Elec. Rail. Journ.

MASTER mechanic, thoroughly experienced and efficient on maintenance and operation of city and interurban cars, shops and barns, seeks opportunity to change. PW-928, Elec. Ry. Journal, Old Colony Bldg., Chicago.

POSITION wanted in any one or a combination of the following allied power or railway activities: Purchasing agent, electrical superintendent, superintendent of construction, superintendent of distribution and operation, superintendent of rolling stock, superintendent of equipment, district superintendent. Technical graduate, eleven years' experience. Now enjoy excellent relations on engineering staff of large railway equipment manufacturer. Personal reasons for leaving. Available upon customary notice. PW-924, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

## POSITIONS WANTED

SUPERINTENDENT of transportation desires a change. Nearly 18 years' experience on large city and interurban properties with a proven record as a competent transportation official; successful in dealing with public and labor. Personal reasons for desiring a change and relations with present employers are pleasant and agreeable. Fully competent to take over any property and operate same in an economical and efficient manner. Best of references as to character and ability. PW-922, Elec. Ry. Journal, Old Colony Bldg., Chicago, Ill.

**You can get**

## A Production Checker

**at little cost**

Here is an opportunity to get a *Productograph* to keep count and make curve chart record on one to twenty producing machines. From these records you know exactly the production you are actually getting from your machines. No guessing. It is in first class condition and various spare parts are included.

**Bargain price for quick sale.**

W. A. Hefner, care of McGraw-Hill Co.,
10th Ave. at 36th St., New York City

## WANTED: A PRESIDENT

### FOR AN ELECTRIC RAILWAY SUPPLY BUSINESS

A syndicate has spent many thousand dollars in perfecting a transfer printing and issuing machine for use on street cars and it is now ready for manufacture and sale. The market for it is certain as it effects operating economies which will repay its cost in a short time. It has also a large field for printing and issuing tickets.

An opportunity is open for a man with the ability and experience to manage this business. The candidate should be one with wide experience and high-standing in the electric railway field or in railway supplies, who is able personally, or through associates, to take a large financial interest in the company. In this will be his great opportunity, as the profit from the sale of this appliance will be very large. Under good management it can produce a fortune for its owners.

***All answers will be held confidential. Address***

**THE ENGINEERING BUSINESS EXCHANGE**
**Charles Whiting Baker, *Director***
**30 CHURCH STREET, NEW YORK CITY**

Printed statement explaining the business methods of the Exchange, which is a clearing house for business opportunities, mailed on request.

## BOOKS & PERIODICALS

**Magazines Wanted**

Back numbers of Electric Railway Journal wanted from 1910 to date. The H. W. Wilson Co., 964 University Ave., New York, N. Y.

FOR SALE

**Contractors' Hoisting Engine**

Double Drum, two cylinders 5¼ in. x 7 in. Fine running order. Price $600.

**JOHNSON BROS.**
Brocton, N. Y.

## *The Searchlight Section of this paper—*

is devoted exclusively to the advertising of idle used and surplus new equipment, and all other business "Opportunities" identified with the field covered by this paper.

***Buyers and others consult "Searchlight" ads for what they want.***

You can reach them quickly and at small cost through an advertisement in the Searchlight Section.

0310

**20%** **20%**

# *NEW*
# REPAIR PARTS

---

G-E—67—58—57—52—1000

## 20% Off Current Prices

---

G-E 1200-800, W-12A

## 20% Over Junk Value

---

*GOING FAST*

*ARE YOU GETTING YOURS?*

Rebuilt G-E 67 Motors

Rewound Armatures and Fields for Above Motors

Malleable—Gear Cases—Sheet Steel

K, K-2, K-10, K-11, K-12, K-14, K-6, Controllers and Repair Parts

AA-1 Air Compressors and Repair Parts

Various Truck Repair Parts

*Send Us Your Inquiries*

RECLAMATION DEPARTMENT

**EASTERN MASS. ST. RY. CO.**
1 Beacon Street, Boston, Mass.

**20%** **20%**

---

**For 20 Years**
we have been
Buying and Selling
**Second-Hand Cars**
Trucks and Motors

At Your Service

**ELECTRIC EQUIPMENT CO.**
Commonwealth Bldg., Philadelphia, Pa.

---

OFFER FOR IMMEDIATE SHIPMENT

## 500-KW. MOTOR GENERATOR SET

1—500 kw. Westinghouse 550 volt, 833 amp., 514 r.p.m. compound wound dynamo direct connected to—

1—720 hp. Westinghouse 3 phase, 60 cycle, 2300 volt, synchronous motor. Outfit self contained, and complete with starting equipment for A.C. and D.C. ends.

**ARCHER & BALDWIN, INC.**
Tel. 4337-8 Rector
114-118 Liberty St.

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*"SEARCHLIGHT"* is the *"OPPORTUNITY"*
advertising of this industry.

0098

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Anchors, Guy**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Automobiles and Buses**
Brill Co., The J. G.

**Axles**
Bemis Car Truck Co.
St. Louis Car Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Babbitt Metal**
More-Jones Brass & Metal Co.

**Babbitting Devices**
Columbia M. W. & M, I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co., The

**Batteries, Storage**
Electric Storage Battery Co.

**Bearings and Bearing Metals**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bearings, Oilless, Graphite, Bronze and Wood**
Bound Brook Oil-less Bearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.
Railway Track-work Co.

**Bending Apparatus**
Railway Track-work Co.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.

**Bending Apparatus**
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail**
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse Elec. & Mfg. Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

**Bridges and Buildings**
American Bridge Co.

**Brooms, Track, Steel or Rattan**
American Rattan & Reed Mfg. Co.

**Brushes, Carbon**
Corliss Carbon Co.
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

**Bunkers, Coal**
American Bridge Co.

**Buses, Motor**
Trackless Transportation Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.

**Bushings, Graphite and Wooden**
Bound Brook Oil-less Bearing Co.

**Cables (See Wires and Cables)**

**Cambric Tapes, Yellow and Black, Varnished**
Irvington Varnish & Insulator Co.

**Cambric, Yellow and Black, Varnished**
Irvington Varnish & Insulator Co.

**Carbon Brushes (See Brushes, Carbon)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
Differential Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
Electric Storage Battery Co.
General Electric Co.

**Castings, Brass, Composition or Copper**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Circuit Breakers**
Automatic Reclosing Circuit Breaker Co.
Condit Electrical Mfg. Co.
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coin-Counting Machines**
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Traction Brake Co.

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

**Condensor Papers**
Irvington Varnish & Insulator Co.

**Connectors, Solderless**
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

**Controllers or Parts**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Electric Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Allison & Co., J. E.

**Conveying and Hoisting Machinery**
American Bridge Co.
Columbia M. W. & M. I. Co.

**Copper Wire**
Anaconda Copper Mining Co.
Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Creosote**
Barrett Co., The

**Cross Arms (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals (See Signals, Crossing)**

**Crossings, Frog and Switch**
Wharton, Jr., & Co., Wm.

**Crossings, Track (See Track, Special Work)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts**
Armco Iron Culvert & Flume Mfrs. Assn.
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

**Cutouts**
Chicago Fuse Mfg. Co.

**Dealers' Machinery**
Archer & Baldwin
Electric Equipment Co.

**Derailing Devices (See also Track Work)**
Wharton Jr., & Co., Wm.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.

**Electrically Operated Switches (Air or Oil)**
Condit Electrical Mfg. Co.

**Electrical Wires and Cables**
American Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. R.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Kelley, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J. G.

**Engines, Gas, Oil or Steam**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**
Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
National Railway Appliance Co.

**Feed Water Heating**
Schutte & Koerting Co.

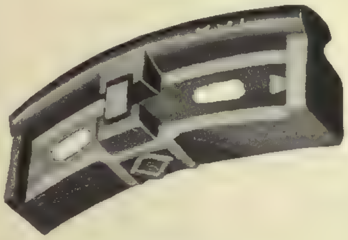
**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.

**Fibre and Fibre Tubing**
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

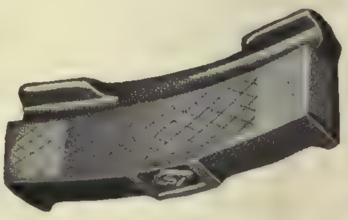
# Brake Shoes
# A. E. R. A. Standards

Diamond "S" Steel Back is the Best Type



**Standard Patterns for**

**SAFETY CAR**



D-67 for Narrow Treads
D-87 for Wide Treads

**American Brake Shoe and Foundry Co.**
**30 Church Street, New York**
**332 So. Michigan Ave., Chicago Chattanooga, Tenn.**

---

# American Rail Bonds

**CROWN**
**UNITED STATES**
**TWIN TERMINAL**
**SOLDERED**
**TRIPLEX**

*Send for new*
*Rail Bond book*

**American Steel & Wire Company**
**CHICAGO**
**NEW YORK**

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# Divali

The most popular festival of the trading classes in India is Divali Day. It marks the opening of the business year. The doors of the Vaishnava heaven are supposed to be thrown wide open and everyone tries his level best to walk the Straight and Narrow in order to start the business year right.

New accounts are opened on this day, fresh transactions are entered into. If business has been good during the past year a man speaks kindly to his wife, if it has been bad he has a fire. Old mistakes are turned to profit; if a man has been doing a thing the wrong way long enough to know that he is doing it wrong, he changes his methods.

All in all, it is a nice sensible holiday.

An American version of Divali Day ought to be a great thing for the operator who still persists in buying motor brushes by Catalogue instead of by Character. With an extra day to think it over he would pretty certainly come to the common-sense conclusion that *fitting the brush to the job* is the best way—the Morganite way!

**Morganite Brush Co., Inc.**

***Main Office and Factory:***
**519 West 38th Street, New York**

DISTRICT ENGINEERS AND AGENTS:

Electric Power Equipment Corp., 13th and Wood Sts., Philadelphia.
Electrical Engineering & Mfg. Co., 909 Penn Ave., Pittsburgh.
R. W. Lillie Corporation, 176 Federal Street, Boston, Mass.
W. R. Hendey Co., Hoge Bldg., Seattle.

Herzog Electric & Engineering Co., 150 Steuart St., San Francisco.
Charles Farnham, I. W. Hellman Bldg., Los Angeles.
Railway & Power Engineering Corporation, Ltd., 131 Eastern Ave., Toronto, Ontario, Canada.

# WHAT AND WHERE TO BUY

**Field Coils (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.

**Floor Plates**
American Abrasive Metals Co.

**Forgings**
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track (See Track Work)**

**Funnel Castings**
Wharton, Jr., & Co., Wm.

**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

**Fuses, Refillable**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

**Gages, Oil and Water**
Ohio Brass Co.

**Gaskets**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas-Electric Cars**
General Electric Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Gongs (See Bells and Gongs)**

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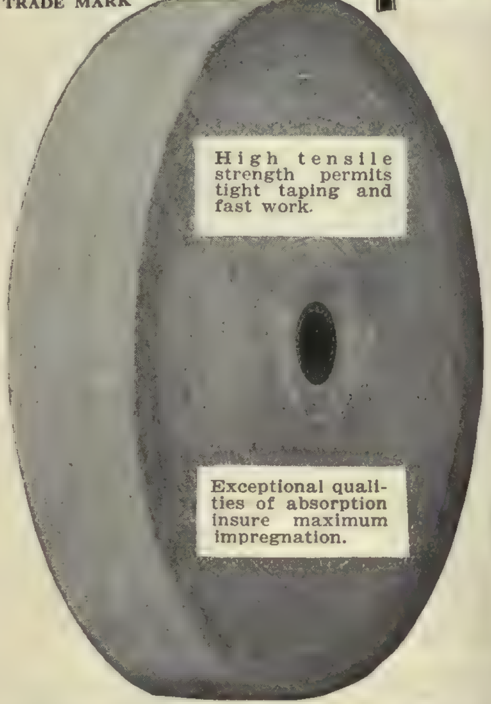
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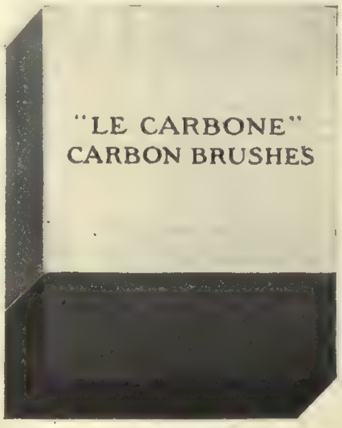

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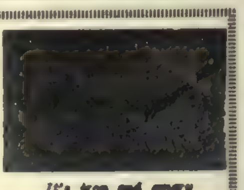
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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Allis-Chalmers Mfg. Co. 32
Allison & Co., J. E. 21
American Abrasive Metals Co. 40
Amer. Brake Shoe & Fdry. Co. 37
American Bridge Co. 21
American Car Co. 45
American Electrical Works 29
American Mason S. T. Co. 42
American Rattan & Reed Mfg. Co. 33
American Steel & Wire Co. 37
Amer. Steel Foundries 42
Anaconda Copper Mining Co. 29
Anderson Mfg. Co., A. & J. M. 29
Archbold-Brady Co. 30
Archer & Baldwin, Inc. 35
Armco Culvert & Flume Mfrs. 15
Arnold Co., The 20
Automatic Reclosing Circuit Breaker Co. 32

B

Babcock & Wilcox Co. 31
Barbour-Stockwell Co. 31
Barrett Co. 43
Bates Expanded Steel Truss Co. 27
Beeler, John A. 20
Belden Mfg. Co. 39
Bemis Car Truck Co. 24
Bennett-Field Cross Tie Co. 29
Bonney-Vehslage Tool Co. 33
Bound Brook Oil-less Bearing Co. 41
Bridgeport Brass Co. 10
Brill Co., The J. G. 45
Buckeye Jack Mfg. Co. 32
Byllesby Eng. & Mfg. Corp. 20

C

Cambria Steel Co. 41
Cameron Electrical Mfg. Co. 31
Canton Culvert & Silo Co. 30
Clark & Co. Mgr. Corp., E. W. 20
Cleveland Fare Box Co. 33
Collier, Inc., Barron G. Back Cover
Columbia M. W. & M. I. Co. 44
Consolidated Car Fender Co. 33
Consolidated Car Heating Co. 33
Continental Fibre Co., The 32
Copper Clad Steel Co. 30

Page

Cooper Heater Co., The 33
Corliss Carbon Co. Front Cover
Cutter Co. 32

D

Day & Zimmermann, Inc. 21
Differential Steel Car Co., The 42
Duncan Lumber Co. 29
E. I. du Pont de Nemours & Co. 12

E

Eastern Massachusetts St. Ry. Co. 35
Electric Equipment Co. 34
Electric Ry. Improvement Co. 31
Electric Railway Equipment Co. 29
Electric Service Supplies Co. 11
Electric Storage Battery Co. 41

F

Feustel, Robt. M. 20
Flood City Mfg. Co. 30
Ford, Bacon & Davis 20
Ford Chain Block Co. 32
"For Sale" Ads 34, 35
Fort Pitt Spring & Mfg. Co. 40

G

Galena-Signal Oil Co. 17
General Electric Co. 18
Gladium Co., Inc. 32
Gold Car Heating & Ltg. Co. 33
Gould, L. E. 20
Griffin Wheel Co. 28

H

Haskelite Mfg. Corp. 21
"Help Wanted" Ads 34
Hemphill & Wells 20
Holst, Englehardt W. 20
Horne Mfg. Co. 33
Hubbard & Co. 30

I

International Register Co., The 33
International Steel Tie Co., The 8-9

Page

Irvington Varnish & Insulator Co. 26

J

Jackson, Walter 20
Jeandron, W. J. 39
Johnson Fare Box Co. 33

K

Kelly, Cooke & Co. 21
Kuhlman Car Co. 45

M

Metal & Thermit Corp. 29
Midvale Steel & Ordnance Co. 41
More-Jones Brass & Metal Co. 39
Morganite Brush Co., Inc. 37

N

Nachod Signal Co., Inc. 30
National Brake Co. 19
National Carbon Co., Inc. 21
National Pneumatic Co., Inc. 13
National Railway Appliance Co. 39
National Tube Co. 29
Nelsonville Brick Co. 30
New York Switch & Crossing Co. 30
Nichols-Lintern Co. 42
Niles-Bement-Pond Co. 32
Nuttall Co., R. D. 16

O

Ohio Brass Co. 7

P

Parsons, Klapp, Brinckerhoff & Douglas 20
Perey Mfg. Co., Inc. 33
Positions Wanted and Vacant 34
Power Specialty Co. 31

R

Rail Joint Co. 32

Page

Railway Track-work Co. 6
Railway Utility Co. 40
Ramapo Iron Works 30
Richey, Albert S. 20
Roebling's Sons Co., John A. 29
Rooke Automatic Register Co. 33

S

St. Louis Car Co. 26
Samson Cordage Works 40
Sanderson & Porter 20
Sangster & Matthews 21
Scaife & Sons Co., Wm. B. 31
Schutte & Koerting 31
Searchlight Section 34, 35
Silver Lake Co. 39
Smith & Co., C. E. 20
Smith Heater Co., Peter 33
Standard Steel Works Co. 25
Standard Underground Cable Co. 29
Southern Cypress Mfg. Assn. 27
Star Brass Works 39
Stone & Webster 20
Stucki Co., A. 42

T

Terry Steam Turbine Co. 31
Texas Co. 23
Tool Steel Gear & Pinion Co. 28
Trackless Transportation Co. 14

U

U. S. Electric Signal Co. 30
Universal Lubricating Co. 14

W

"Want" Ads 34
Wason Mfg. Co. 45
Westinghouse Elec. & Mfg. Co. 2, 4
Westinghouse Traction Brake Co. 5
Wharton, Jr., & Co., Wm. 30
White Engineering Corp., The J. G. 20
Williams & Co., J. H. 32
Wish Service, The P. Edw. 42
Wood Co., Chas. N. 29

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Standard for Electric Railway Service
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MASON SAFETY TREADS
Standard for 25 years for car and station steps.
STANWOOD STEPS
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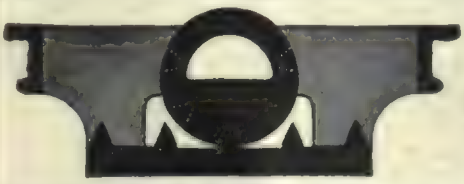

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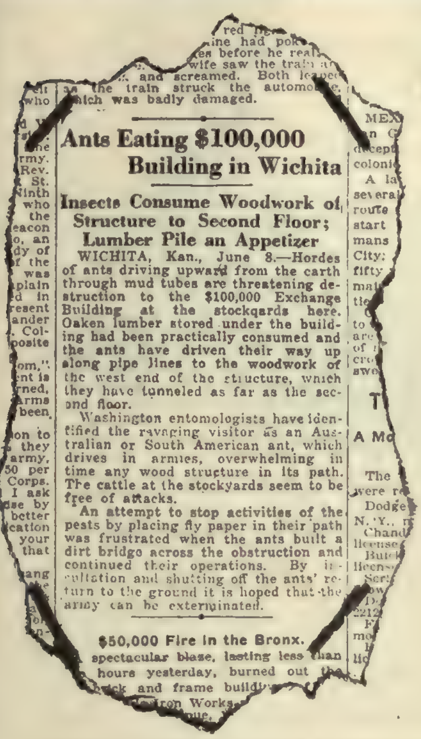

ine had pok...
...es before he real...
wife saw the tra...
... and screamed. Both leaped
as the train struck the automo...
...ich was badly damaged.

**Ants Eating $100,000 Building in Wichita**

**Insects Consume Woodwork of Structure to Second Floor; Lumber Pile an Appetizer**

WICHITA, Kan., June 8.—Hordes of ants driving upward from the earth through mud tubes are threatening destruction to the $100,000 Exchange Building at the stockqards here. Oaken lumber stored under the building had been practically consumed and the ants have driven their way up along pipe lines to the woodwork of the west end of the structure, which they have tunneled as far as the second floor.

Washington entomologists have identified the ravaging visitor as an Australian or South American ant, which drives in armies, overwhelming in time any wood structure in its path. The cattle at the stockyards seem to be free of attacks.

An attempt to stop activities of the pests by placing fly paper in their path was frustrated when the ants built a dirt bridgo across the obstruction and continued their operations. By insultation and shutting off the ants' return to the ground it is hoped that the army can be exterminated.

**$50,000 Fire in the Bronx.**

spectacular blaze, lasting less than ... hours yesterday, burned out the ... and frame build... Iron Works...

*Clipping from the New York Tribune, June 9th,* 1921

# *Read this Clipping—*

IN many sections of the country white ants (termites) are causing rapid deterioration of structural timber, and this menace is spreading rapidly.

Investigations of these insects made by the U. S. Department of Agriculture are reported in Farmers' Bulletins Nos. 759 and 1037, and among the preventive measures advocated is the following:

> "Where stone or concrete foundations are impracticable, timber impregnated with coal-tar creosote should be used. Untreated beams should never be laid on the earth nor imbedded in moist concrete, since they will rot, even if they do not become infested.
>
> "Any wood construction in contact with the ground is especially liable to attack by white ants. Among these may be listed construction timber in bridges, wharves, and similar structures, telephone and telegraph poles, mine props, railroad ties, posts, lumber piled on the ground, wooden boxing for cables, cypress water tanks, etc."

# Carbosota Protects Wood from *White Ants* as Well as Decay

TO check the loss occasioned by the white ant pest, preservative treatment should be applied to all lumber and timber used in contact with other wood, or with the ground, masonry, or brick and concrete foundations. The treatment must be thorough, and the method employed must, of necessity, be practicable under conditions common to general construction.

Barrett
Carbosota
Liquid Creosote Oil
For Preserving Wood

In effectively combating ants and other wood-destroying insects, as well as in checking the ravages of wood decay, Carbosota—particularly when applied by the Open Tank process—is proving a great boon to lumber users all over the country.

Carbosota Liquid Creosote Oil is the ideal wood preservative for non-pressure treatments, i.e., Surface treatments (brushing, spraying and dipping) and the Open Tank process (hot and cold, or hot and cooling bath). It is a standardized, highly refined, liquid grade of pure coal-tar creosote oil, specially processed and uniform the world over.

Write for free booklet.

*(Green wood cannot be effectively creosoted by non-pressure processes. It should be seasoned. All framing, drilling of bolt holes, etc., should be done before treatment. If this is impossible, two brush coats of Carbosota should be applied to all untreated surfaces exposed by subsequent cutting or drilling.)*

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New York, Chicago, Philadelphia, Boston, St. Louis, Cleveland
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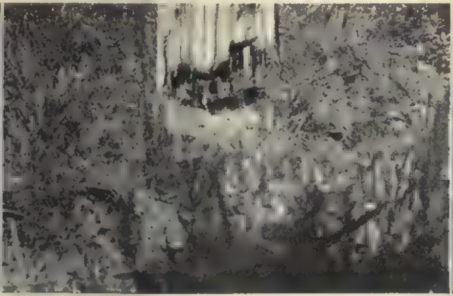
THE BARRETT COMPANY, Limited: Montreal, Toronto, Winnipeg, Vancouver, St. John, N. B., Halifax, N. S.

*Oak floor honeycombed by white ants (termites). [Reproduced from Farmers' Bulletin* 1037, *U. S. Dept. of Agriculture.]*



*Serious deterioration of telegraph pole near ground line due to white ants (termites).*

*Untreated sills and posts in contact with brick foundation piers entirely destroyed by white ants (termites).*

# Trolley Wheels
## and
## Line Material

# COLUMBIA-MADE QUALITY

We've been advertising our shop service and wide line of electric railway specialties pretty broadly because we want you to learn to call on us for Columbia-Made Quality Materials of all kinds.

If you've been in the electric railway game for any length of time at all, you naturally think of Columbia first when it comes to trolley wheels or line materials.

## Where the Current Flows—

the best materials are the only economical ones to use.

Columbia Trolley Wheels are cast from purest metals correctly alloyed to give the longest-wearing bronze of high current capacity. Supplied with oil-less bushings unless otherwise specified. Stock diameters, 4¼, 5 and 6 inches.

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- Coil winding machines
- Pinion pullers
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- Signal or target switches
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- Armature and field coils
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- Brake forgings, rigging, etc.
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- Trolley poles (steel) and wheels

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In business districts of large cities where traffic volume demands practically a moving sidewalk of cars, the Peter Witt Car saves time because its wide front-entrance platform doors admit passengers in double column, and with the conductor on the forward side of the center doors the entire front half of the carbody serves as a long loading platform capable of holding at least 65 passengers.

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**Barron G. Collier**

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*Monthly Mechanical and Engineering Edition*

# ELECTRIC RAILWAY JOURNAL

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Scientifically and
Accurately
Compounded to
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This increase in the number of Electric Railways that have standardized on Tulc is traceable to—first, an exceptional product; second, an exceptional lubricating service.

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*The* UNIVERSAL LUBRICATING COMPANY

# WHAT will extend the growth of the Electric Railway Industry?

# Freight Haulage!

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WHILE the good will of patrons in rural communities alone should encourage this service, there are substantial earnings to be gained by hauling freight.

WITH Westinghouse freight-car equipments and Baldwin-Westinghouse locomotives, the requisites to successfully engage in this profitable business are few and the added expenses small.

**Westinghouse Electric & Manufacturing Company**
East Pittsburgh, Pa.

# Westinghouse

*Vol.* 58, *No.* 8 New York, August 20, 1921 *Pages* 267-304

# Electric Railway Journal

HENRY W. BLAKE and HAROLD V. BOZELL, Editors HENRY H. NORRIS, Managing-Editor

## *Contents*

### Substation in the Downtown District of San Francisco

In an interesting article J. E. Woodbridge describes how the Market Street Railway has constructed a new substation for the heavy traffic district of San Francisco to take care of excessive voltage drops during peak hours. .Page 269

### Springs for Easy Riding Cars

L. F. Seelar says the ratio of the dead load to the live load and that of maximum load to average load are factors that make it difficult to design springs with easy riding qualities........................................Page 275

### Systematic Maintenance Proves to Be Good Investment

Methods used and results obtained by one large railway indicate that careful attention to maintenance details produces most satisfactory conditions—Concrete example discussed, using data gathered from survey of shops and records ..................................................Page 279

EDITORIALS ................................ 267

JIG FOR REBABBITTING COMPRESSOR CONNECTING RODS ................................ 274

ELECTRIC TOWER WAGON........................ 277

RESULTS FROM CADMIUM-COPPER TROLLEY WIRE 277

DES MOINES RIDES BUSES AND WALKS......... 283

ECONOMIES FROM THE USE OF BALL BEARINGS. . 288

EQUIPMENT AND ITS MAINTENANCE........... 289
- New Type Brake Slack Adjuster
- Spring Leaves Tempered Separately
- Cutting Device for Asphalt Pavement
- Convenient Test Box

NEWS OF THE ELECTRIC RAILWAYS............ 292

FINANCIAL AND CORPORATE.................. 295
- Suspension and Receivership in Saginaw

TRAFFIC AND TRANSPORTATION............... 299
- One-Man Operation Attacked in Milwaukee

PERSONAL MENTION......................... 302

MANUFACTURES AND THE MARKETS............ 303

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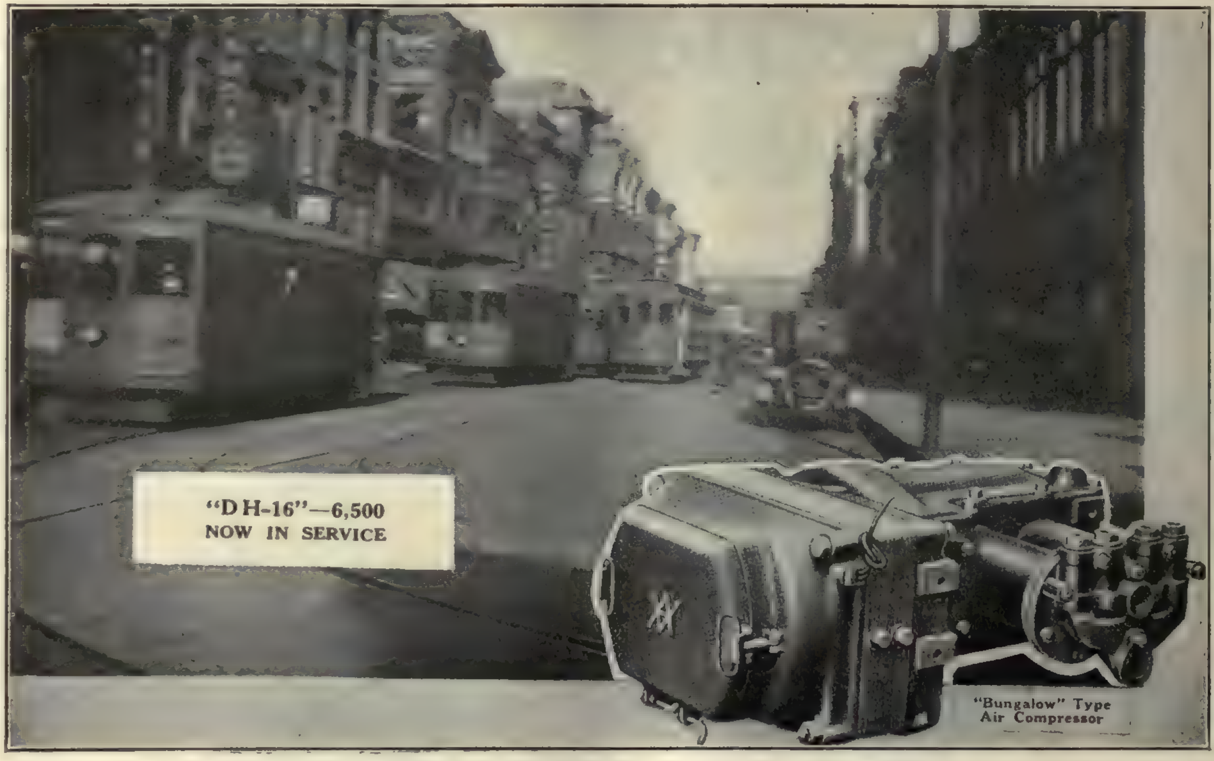

"Bungalow" Type Air Compressor

# A GROWING DEMAND PROVES ITS WORTH

Recent figures show 6,500 Westinghouse DH-16 "Bungalow" compressors now in use—and the number growing. This fact in itself is sufficient to substantiate the claim that no other machine so fully meets the requirements of the light or medium weight car, where a capacity of 16 cu. ft. per minute is ample to insure the maintenance of an adequate supply of air for the various functions of the brake and control equipment.

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The City of Detroit, Department of Street Railways, basing its action on previous experience, has ordered 200 of its new Safety Cars equipped with these compressors.

*Ask for Publication* 9045.

## WESTINGHOUSE TRACTION BRAKE CO.

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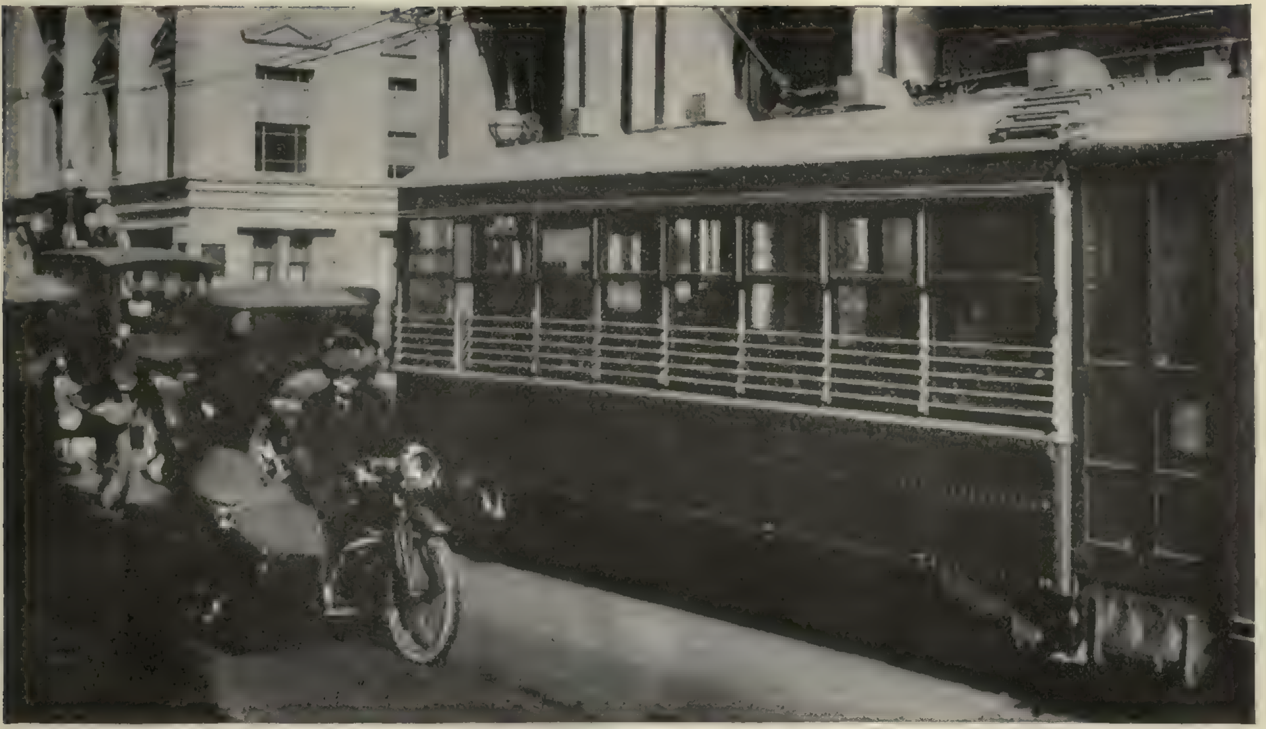
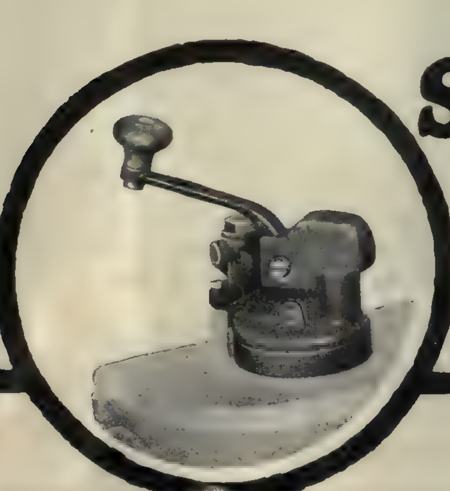


# SAFETY CAR a Standard with the City of Detroit

## 250 IN SERVICE OR ON ORDER

THE City of Detroit, Department of Street Railways, has chosen Safety Cars as a standard of operation on the new Municipal System now in course of development. An initial order of 25 units of this type proved so satisfactory over a long period of service that additional orders recently placed will bring the total up to 250.

Detroit's progressive policies since it undertook the development of the Municipal project have been the subject of considerable discussion in the Traction field. The action of the management in turning to Safety Cars for approximately 85 per cent of future operations is additional evidence of progressiveness, and may also be regarded as further indorsement of the Safety Car's achievements in other great Metropolitan cities, including Boston and New York.



**SAFETY CAR DEVICES CO.**
**OF ST. LOUIS, MO.**
*Postal and Telegraphic Address:*
**WILMERDING, PA.**
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

*It is not a Safety Car unless equipped with our standard Air Brake and Safety Car Control Devices.*

# The First Installment For Net Earnings

*Some of the products these Distributing Houses carry in stock*

**Caps and Cones**
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**Pole Line Material**
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**Dry Batteries**
**Flood Lights**
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***in fact everything electrical.***

You can use the same big idea in buying that is used by the most successful businesses you know. They collect the first installment of their profits when they buy. But do not misunderstand. That does not mean they dicker to cut the last possible cent off prices and then buy at the lowest price.

The idea behind their buying practices is bigger than that. They seek Quality, of course, but, in addition they buy Service, a service that simplifies and cheapens their costs of doing business.

You can adopt these methods. The nearest Western Electric Distributing House can help you do it. Its large stocks of standard electrical goods assure you of Quality, of the exact goods wanted, and of quick deliveries. The ability to get everything needed at this one place will simplify your buying, your stock keeping and your bookkeeping. These advantages all help to reduce your overhead expenses.

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# Birmingham Is Doubly Wise

It was a wise move on the part of Birmingham Railway Light & Power Company to purchase one man safety cars—the cars which have brought better service to many a community and better earnings to the railway.

It was another canny act when Birmingham equipped these cars with O-B Catchers, O-B Trolley Bases and Crouse-Hinds Imperial Headlights—devices which give better service on the cars and need less attention from the mechanical department.

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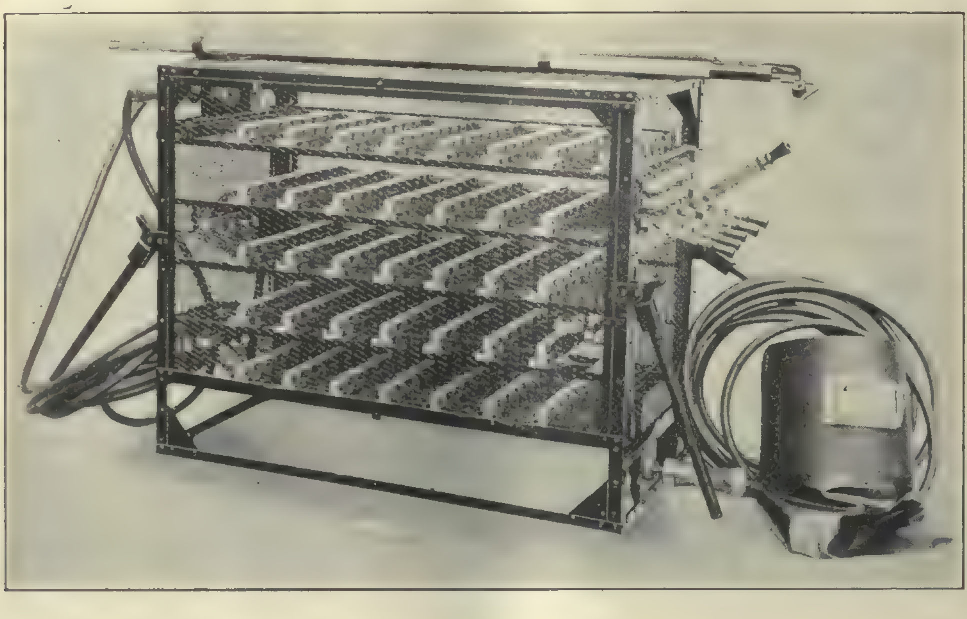
High Tension Porcelain Insulators; Trolley Material; Rail Bonds; Electric Railway Car Equipment; Third Rail Insulators.

*Exclusive Agents in U. S. for Crouse-Hinds Imperial Headlights.*

# Receiving Joints Are Bound to Cup



# Ajax Welder and Atlas Grinder
# for
# Bad Joints and Battered Frogs

## Don't let them get any worse!

ATLAS Rail Grinder

On double-track line in paved streets, every joint continually gets a one-way pounding. The receiving rail gets a trifle low, then every wheel revolving rapidly, with tons of weight on top of it, drops into the hollow and rapidly deepens the originally slight depression. Frogs suffer in about the same way.

Prompt action, at the first sign of cupping is the way to ensure long life to one-way track.

Make Ajax and Atlas fix them now!

## RAILWAY TRACK-WORK CO.

**3132-48 East Thompson St., Philadelphia**

# SEGUR

## COIL WINDING TOOLS

### *For Speedy Coil Making*

A hurry-up repair job! Armature completely burnt out—a hundred or so coils to be wound in double quick time.

That's where the Segur Coil Winder comes in. Quickly adjusted to proper size. Every coil accurately wound—all coils uniform. Assembling of armature is thus made easy. No jamming into the slot—no stripped insulation. Time saved! Money saved!

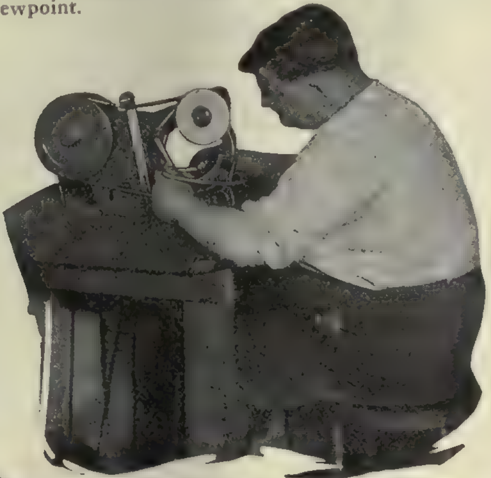
The Segur Coil Spreader is a companion to the Winder. After being wound the coil is spread and pulled into proper shape by this machine. Quickly adjustable—sure and firm grip—one movement shapes coil—instantly released.

The Segur Taping Machine is another companion. Tapes coils rapidly and accurately. Easily operated—pays for itself quickly.

Segur Coil Winding Tools are essential to speedy and economical winding of coils. They do away with costly wooden forms and their maintenance. Easy to operate, sturdily built—little or no maintenance expense. A sound investment from every viewpoint.

*Segur Hair Pin Loop Winder fitted to Segur Lathe Head.*

*Segur Coil Spreader*



Segur Coil Taping Machine

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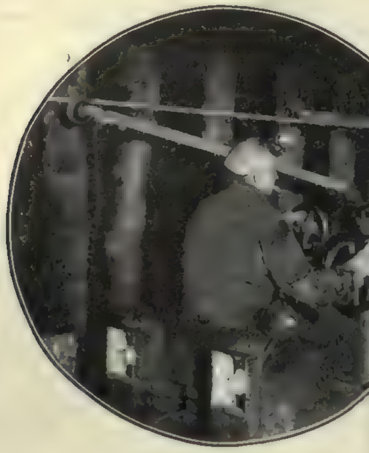

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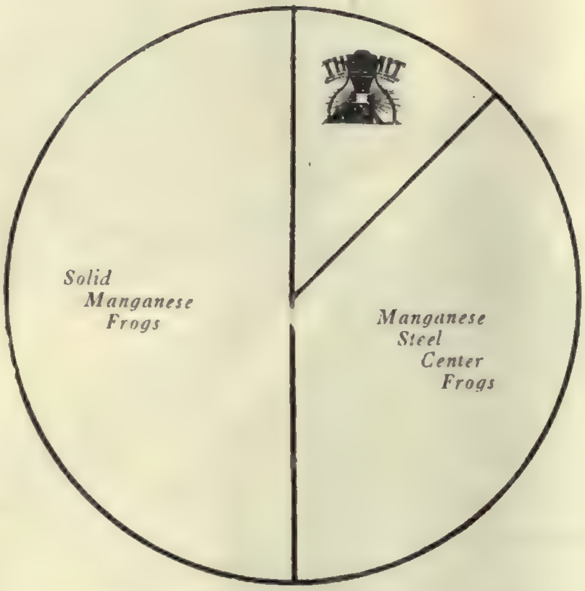

*Approximate Relative Cost of Thermit, Maganese Steel Center and Solid Manganese Frogs.*

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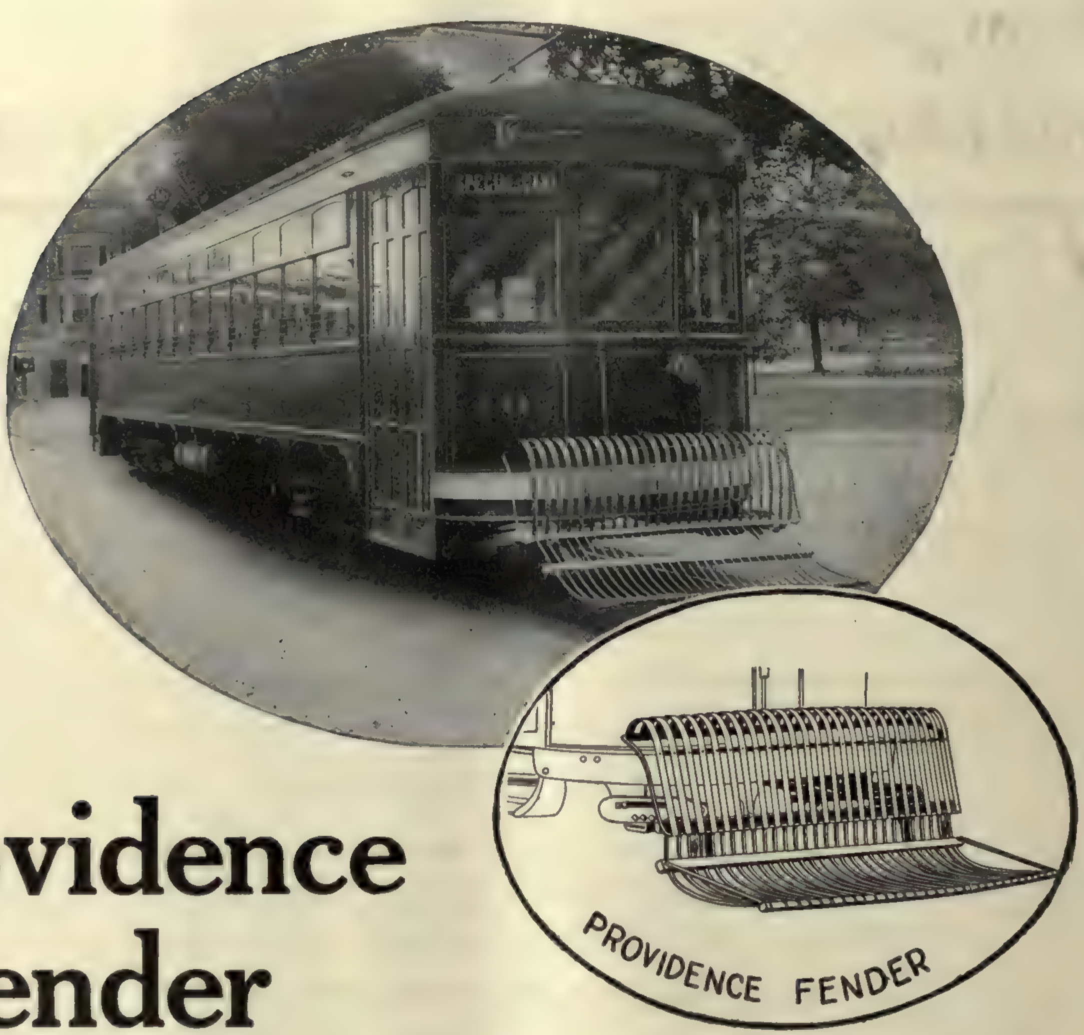

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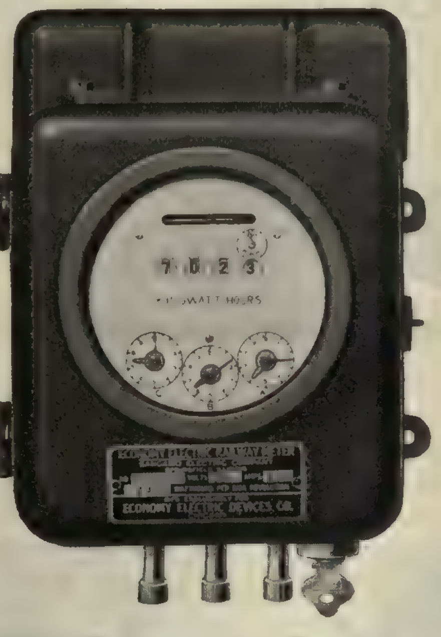

**ECONOMY Meter with Power-Saving and Car Inspection Dials**

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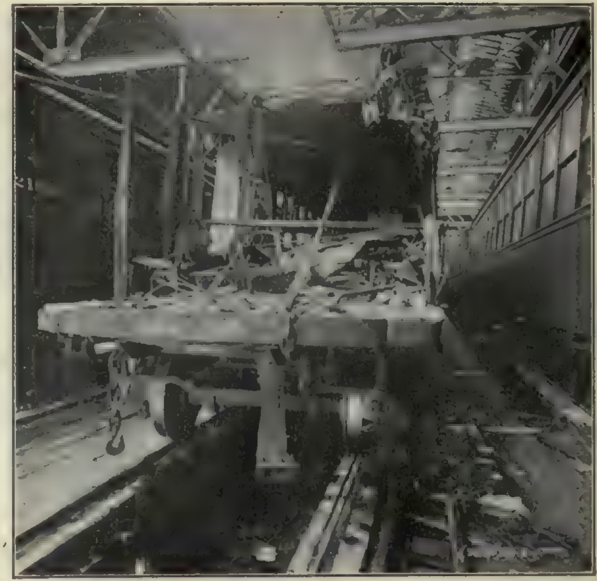

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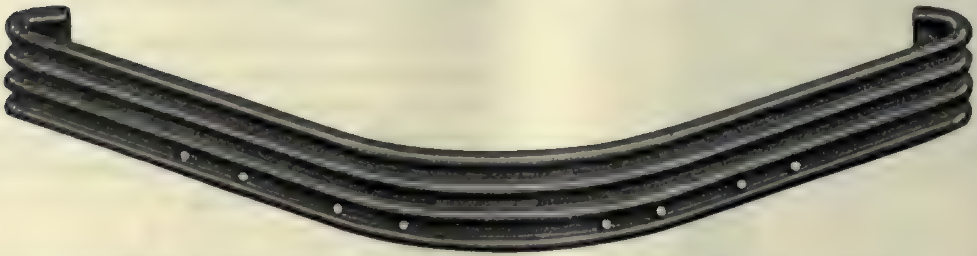

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# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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### Most Power Plants Afford Some Opportunity for Saving

EVERY worth-while power engineer is keen to find and eliminate some energy or labor loss. This is his real job, even if he is mainly an operator rather than a designer. And there are losses enough in the best of power plants, some inevitable, many otherwise. Here is where the engineer who deals with dynamics, with motion, has an advantage over the one whose work lies principally with statics; that is, stresses in structures such as buildings and bridges. The power expert can see immediate effects of his work, say in reduction in rate of fuel consumption. On the other hand, while good work in bridge design, for example, is reflected in construction cost, the structure, once built, loses interest for the designer. He cannot be constantly at work improving it. Power plant work is, therefore, a peculiarly fascinating branch of engineering.

That there are so many chances to save in the power plant is due to several causes that do not necessarily reflect discredit upon the engineers of the past. Great improvements have recently been made in all elements of power-plant equipment. This is particularly true with those which have been the most notorious energy wasters, the prime movers. Moreover, the power plant has come to be considered more intelligently as a unit, all parts being expected to contribute to the general efficiency. For example: energy necessarily wasted in auxiliaries has been reclaimed in other parts of the plant, thus maintaining "heat balance." And again, the economies of the power plant have been upset, due to relative changes in costs of construction materials, fuel, money and labor among themselves and to the diminishing rates of cost of producing a unit of energy to its selling price. This last-named item is in effect the same whether the utility sells the energy generated or uses it in furnishing transportation service. These three factors in combination make possible such savings as were chronicled in the article in the Aug. 13 issue and which were made in the power plant of the Philadelphia & Wilmington Traction Company.

This performance suggests a brief review of the problems which confront the power-saving engineer. His first task is to trace the heat losses to their sources, in the flue gases, in the condenser circulating water, in radiation, in leakages, etc. Out of every pound of coal burned he finds the first taking possibly 25 per cent, the second 60 per cent and the others variously dividing among them, say, 5 per cent of the remaining 15 per cent of the heat in the coal. His first question is as to the reasonableness of these several losses. If one looks large compared with that in similar plants he knows he has "found the scent."

The next step is to locate the possibilities of loss reduction. If the flue gas losses are too great the gases are too hot, too voluminous or of wrong composition, possibly all of these. This means better design and operating practice in the boiler room. If the rejection of heat from the prime movers is excessive there is something wrong in the turbine or condenser design, in the circulating water, in the pumps or in the operating practice. The remedy may be so drastic here as the purchase of a new unit. The smaller losses are not so important as those mentioned. But lagging to control radiation, lubrication to minimize friction and good joinery and packing to eliminate leakage, all play their part. Moreover, radiation, friction and leakage all come out of the coal pile, no matter where they occur in the power plant. This point is emphasized since a heat-working auxiliary may be overlooked because it is obscure. Its remote location may lead to the inference that it produces insignificant losses, but the fallacy of this is self-evident.

So much for thermal, thermo-dynamic and dynamic losses. Now as to that more tangible loss, human energy. At present labor is mainly used in the power plant in handling materials, *i.e.*, coal, ashes, etc., and in lubricating, cleaning and overhauling machinery. The former work offers the principal opportunity for saving. In the past power plants generally have been overmanned. Some are overmanned today, in the sense that machines could be had to do their work. No power plant engineer can afford to overlook the progress that has been made in the past few years in the development of labor-saving machinery.

The upshot of this whole matter is that, in connection with every power plant organization, some one person should have the responsibility of studying constantly the opportunities for saving. He may be one of the staff or an outside consultant. Plans should be in hand for contemplated improvements even if these are in the distant future, so that each detail can be worked out in harmony with the ultimate aim. Only thus can the tearing out and replacement process be reduced to a minimum.

### Must Operations Cease to Prove Essentiality?

DES MOINES' predicament in final analysis is about the same as that which prevailed at Bridgeport, Conn., a year or so ago when the citizens were compelled by the shutdown of the local lines of the Connecticut Company to choose between street cars and jitneys. But the present indications are that the people of Des Moines are going to take a longer time than did the citizens of Bridgeport to learn how much more serviceable to them are the street cars than the buses.

Conditions in Des Moines have been gravely aggravated by a malicious press and by a former city corporation counsel whose greatest ambition seem to be to harass the utilities and to exact the city's pound of flesh even to the destruction of the company. Having but recently bound itself to a 5-cent fare, the Des Moines City Railway has been particularly susceptible to the activities of this shrewd lawyer and to the continual harping of the papers that it was not living up to its contract. The facts, however, fail to disclose that the company has been particularly remiss in this respect.

Among other things, the company agreed in the 1915 franchise to spend $1,500,000 in specified improvements in the next three years. Actually it spent $2,500,000, but on account of the great rise in cost of materials and equipment, even $1,000,000 in excess of the agreement was not sufficient to complete the program, and some promised new track apparently much wanted by the residents has not been built. Then, of course, the contract fare of 5 cents has not prevailed, but not by the grace of the city. The courts interfered and established a 6-cent fare, and later an 8-cent fare. Thus foiled in its demand, the city authorities sought recourse by opening wide the doors to jitney and bus competition. The invitation was promptly accepted to such an extent that 20,000 people a day, or 25 per cent of the total, were soon taken from the street cars. A further blow came when the court allowed the manufacturer to remove electrical equipment not paid for, thus shutting down three substations and a large generator at the power house and necessitating a 50 per cent cut in cars used. At this disadvantage, and with competition increasing, continuation of railway operation was of course impossible.

Thus far, then, the city has won its battle, but what of the future? The company will not start up again until the ruinous competition of the buses has been removed. If the buses cannot carry all of Des Moines' traffic, they can ruin the railway's ability to be self-supporting. If buses can supply all the transportation for a city of 126,000, which seems improbable without intolerable congestion on the streets and in the buses, though some of the characteristics of Des Moines are favorable to bus operation, it is quite certain that they cannot do it on a 5-cent fare. Evidently some solid doubts of this nature have been in the minds of the members of the City Council, for that body has not seemed to take very seriously the several propositions offered by the bus people, which is about the only creditable thing that can be said of its recent actions and inactions.

It will not take many weeks of the present congestion and grave shortage of transportation facilities to convince the great majority of the people that they want the street cars back. It may take some little time, however, for this feeling to be manifest with sufficient insistence to crystallize the indecision and lack of any plan on the part of the Council. Meanwhile, the city suffers immeasurable discomfort, inconvenience and financial loss.

It seems incredible that things should have to come to such a pass before public officials will comprehend the plain economics involved and what is really for the best interests of the people. Yet Toledo had to go through a cessation of car service before it could understand that the company was in earnest about its need for a fare increase; Bridgeport learned by the same process that it had to regulate the jitneys, and now Des Moines, with a very similar case in Bay City and Saginaw, Mich.

Are companies to be forced to these tactics in the many other cities where the patience of man and the endurance of the company have about been exhausted—New Orleans, Indianapolis, Akron, New York, Louisville, Chicago, Dallas, Detroit, Birmingham, etc.?

Serious as is the situation for the company and Des Moines, it nevertheless has placed the railway at an advantage in securing equitable conditions before resuming operations. There is no disposition to "stick" the city because of this position, but undoubtedly the city will have to agree to certain fundamental requirements of the company before the street cars will run again. Unfortunately, even with all requirements satisfied, it will take from two to three months before full service can be restored on account of the time required to finance and replace the electrical equipment that has been removed. It is certainly to be hoped that the officials of other cities will profit by the experience had in Des Moines and evolve a policy which will protect the public but at the same time enable the local railway company to continue uninterrupted its faithful and essential service. If the shutdown in Des Moines is a strategic move, it is so only incidentally, for the company could not have continued under the circumstances. And it cannot be expected that the beautiful weather, courtesy of private automobiles, the good nature engendered all around by the novelty of the experience and the exceedingly small amount of riding as compared to normal will continue long to lighten materially the task confronting the buses.

### Boston's Prospects Much Better

BOSTON newspapers were all in accord in their comment on the report of the Boston Elevated Railway for the year closed recently. They see in the accumulated deficit of $4,980,000 a formidable barrier, precluding any immediate prospect of relief from the 10-cent fare, but they also see in the change for the year to a profit of $550,253 from a profit for the previous year of $17,079 a most encouraging sign for the future.

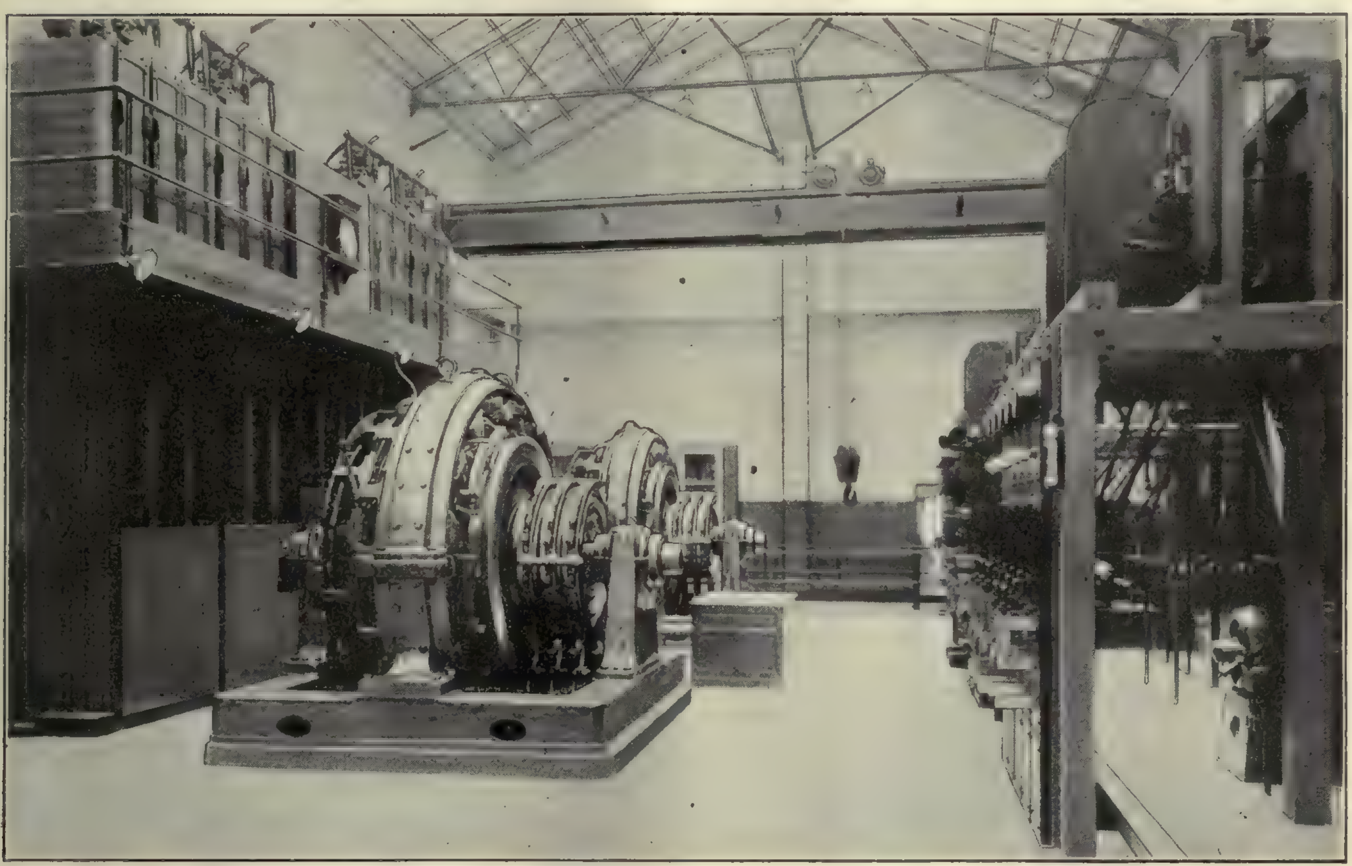
It was during the trying period in 1919 that the large deficit was accumulated. Since then the record has been progressively good. Ten cents seems large for a ride where 5 cents had prevailed, but the 5-cent, then the 7-cent and the 8-cent fare failed to prove adequate. It was the 10-cent fare that saved the situation. This the trustees are anxious to reduce. They labor under the necessity, before that can be brought about, of building up the reserve fund to $1,000,000 and of reimbursing the cities and towns in which the company operates to the tune of $3,980,000, advanced by the communities in the lean days of 1919. Just as the tide of rising costs in that year ran against the company and the communities, so the tide now is in the other direction. It is always dangerous to prophesy, but it is not unlikely that for the coming year the excellent showing for the period recently closed will be bettered materially.

One thing the statement of the trustees has done, it has made plain beyond the possibility of misconstruction the actuating ideas behind the extension by the company of the limited 5-cent fare service. The trustees have clearly in mind building up the property so that it will be of the greatest public service, but they state definitely that the 5-cent service cannot be continued if it interferes with or delays an otherwise possible reduction of the basic flat fare for travel throughout the system. Should a reasonable test prove that this service invades or seriously threatens an invasion of the net revenues of the railway, the trustees say they will be forced to advance the local 5-cent fare or else to abandon the experiment.

# Downtown Substation in San Francisco

## The Market Street Railway Has Constructed a New Substation for the Heavy Traffic District of San Francisco to Take Care of Excessive Voltage Drops During the Peak Hours

BY J. E. WOODBRIDGE
Resident Engineer Ford, Bacon & Davis, San Francisco



INTERIOR OF SUBSTATION WITH EQUIPMENT IN OPERATION

AS IN most large cities, the substations and 600-volt feeder system of the United Railroads of San Francisco grew out of old steam plants, poorly located for supplying the most congested portion of the load. The downtown district of San Francisco, including the heavy traffic of four tracks on lower Market Street, has been until recently supplied largely from the Bryant Street substation (originally a steam plant) situated some 20,000 ft. from the ferry.

In spite of a large tonnage of feeders, the voltage drop during the peak hour from 5 to 6 p.m. would run as high as 250 volts, giving a loss of approximately 2,000 kw. wasted in heating overhead copper and track return.

The United Railroads of San Francisco bought energy under a contract rate of $7.50 per thousand kilowatt-hours at 11,000 volts, with a guaranteed load factor of 60 per cent. As this load factor is not reached, the basis of the contract becomes power and not energy, the price being approximately $40 per kilowatt of peak demand per annum.

As 2,000 kw. of loss at this rate amounts to $80,000 per annum, it is obviously worth while to give careful consideration to any means by which this loss might be materially reduced.

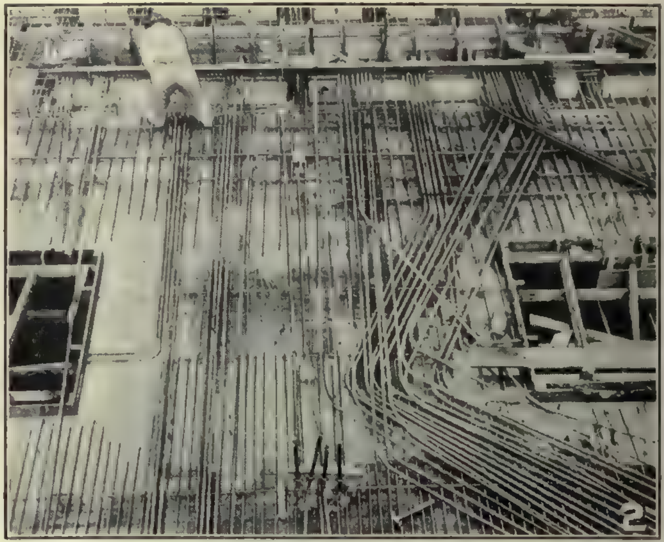
In spite of municipal competition, the traffic of the United Railroads of San Francisco (now the Market Street Railway) has been steadily growing, increasing the load on stations and feeders to the value reached during the Panama Pacific Exposition and requiring extensions to take care of future growth.

The writer estimated that the installation of a 4,000-kw. substation, suitably located in the downtown district, would reduce the feeder losses and, thereby, the peak demand by approximately 1,200 kw., besides releasing a large amount of copper. Such a substation has been built and, at this writing, has been in full operation less than one month, which is not a sufficient period to give an accurate comparison of new with old system peak demands, but there is every indication that the estimated saving will be exceeded.

### CONVERTERS PREFERRED TO MOTOR-GENERATORS

On account of lower first cost and higher efficiency, converters were chosen for this service instead of motor-generator sets as used in the older stations. The use of converters so close to heavy traction loads involves several serious difficulties, all due to the absence of direct-current feeder resistance to reduce the rush of short-circuit current in case of a broken trolley,

## Construction Details and Equipment Arrangement for New Substation of the Market Street Railway in the Downtown District of San Francisco



No. 1—Exterior of substation as partly completed.

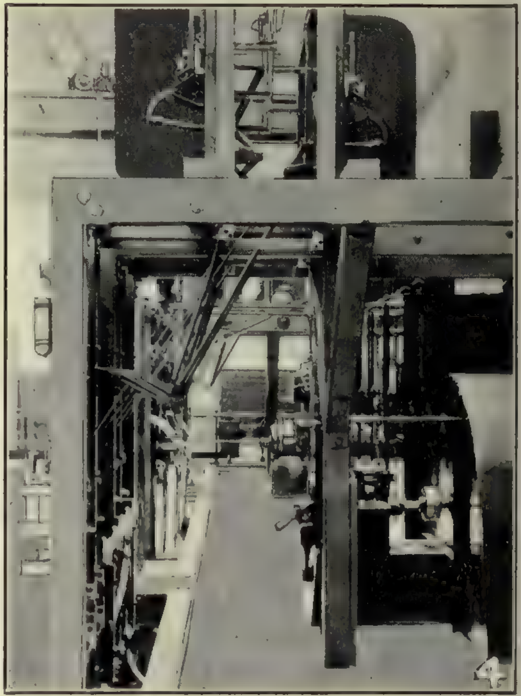
No. 2—Installing conduits for small wiring in floor of station.

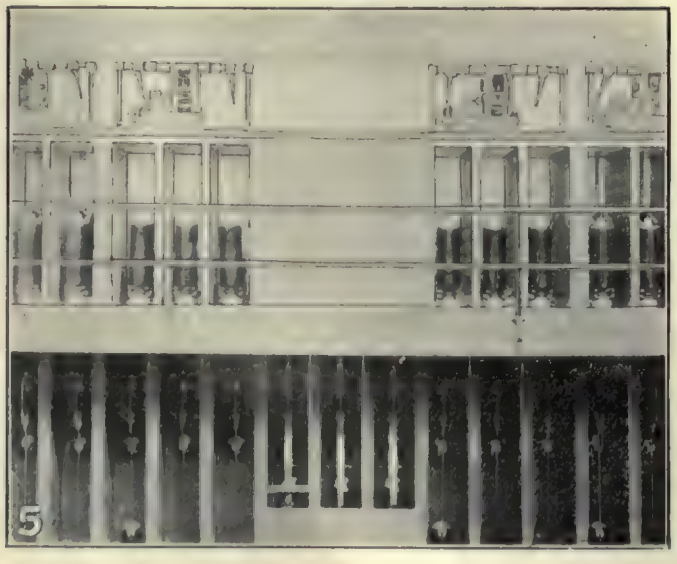
No. 3—Looking at the glass roof.

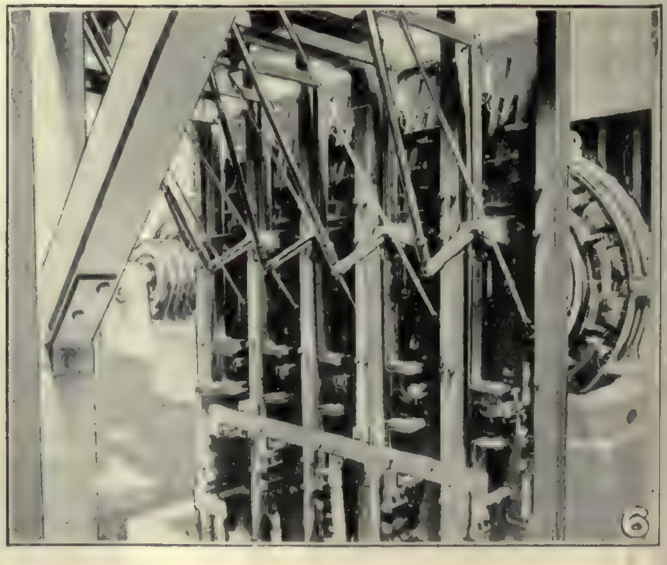
No. 4—General view back of the switchboards.

No. 5—Oil switches and disconnecting switch arrangement.

No. 6—Rear view of feeder switchboard.







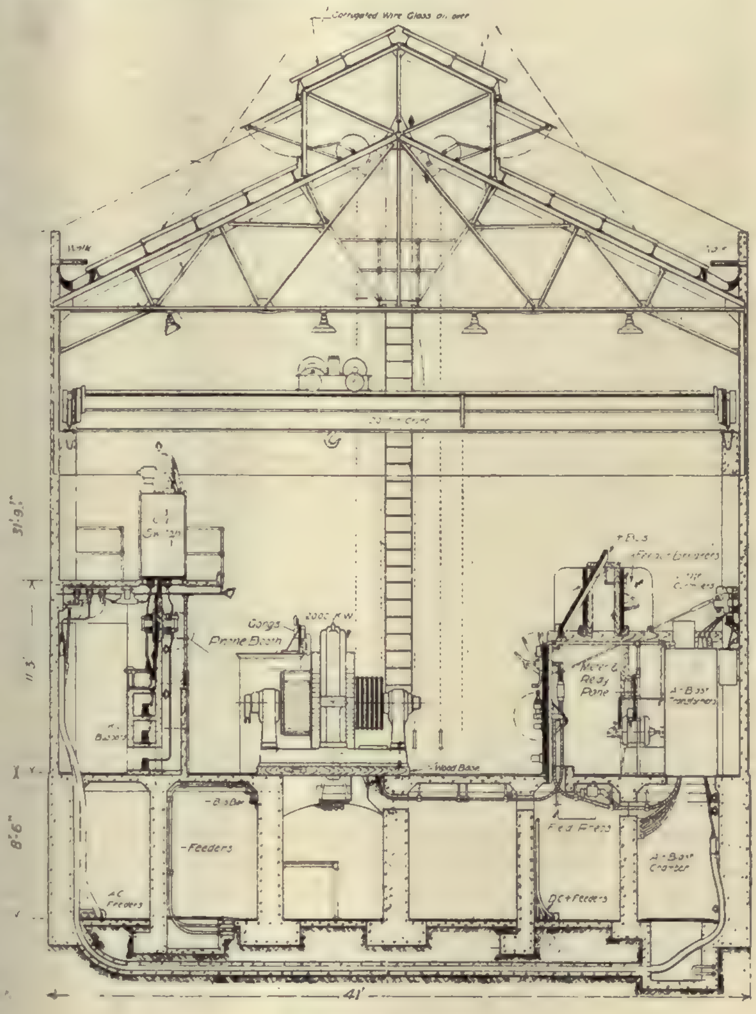
car-equipment failure or other fault from feeder network to ground. The old specification of no feeder taps nearer than 2,500 ft. to the station is not applicable where the heaviest load is 250 ft. away, and 2,500 ft. is about as far as the station feeds. The manufacturers' specification of sufficient feeder resistance to limit the short-circuit current of one feeder to three times full load of one machine is also not applicable where one feeder has a peak-hour average demand of 3,000 amp., which is approximately the rating of one converter. This would require a 30 per cent drop in this feeder or about a 500 kw. loss at $40 per kilowatt per annum. Precautions of various sorts, described below, were taken to protect the machines, operators and circuit-breakers, and the minimum resistance to any one point on the trolley network was made at 0.025 ohm, which would, obviously, limit the current to 20,000 amp. at 500 volts. This resistance was obtained, in most cases, by bringing the feeders out from underground to overhead as near the substation as possible and running the balance of the distance in weatherproof cable at a higher current density than can be used underground without danger of burn-outs. Added resistance was necessary in only two feeders, involving a loss of approximately 10 kw. in each at the peak. One of these resistances is used as an electrical furnace with air taken from the air blast chamber to warm the office.

### EQUIPMENT FEATURES DIFFER FROM USUAL PRACTICE

The converter fields are shunt wound, this departure from standard railroad practice having been taken for several reasons, as follows: First, to ease the severity of short circuits; second, to reduce the number of heavy windings and joints of large capacity in the machines; third, to eliminate the equalizer busbar, switches and connections and to simplify operation, and fourth, to improve the power factor on the assumption that the equipment will be loaded to its capacity on the basis of temperature rise, in which case improved power factor is a decided advantage. The commutating poles are of the high-reluctance design, their ampere turns being greater than those of the armature.

A somewhat unexpected advantage has resulted from the shunt characteristic. As the station output rises in the late afternoon, from approximately 6,000 to 9,000 amp., the voltage automatically falls off from 550 to 500 volts. As the peak is occasioned by congestion of cars on the downtown streets, which of itself necessitates slow running, the lower voltage undoubtedly results in less resistance loss in car equipments and improved system economy. The voltage drop is, however, so much less than with the old long feeds that better schedules are maintained, and a car will probably be dropped from each of several routes, without increase of headway.

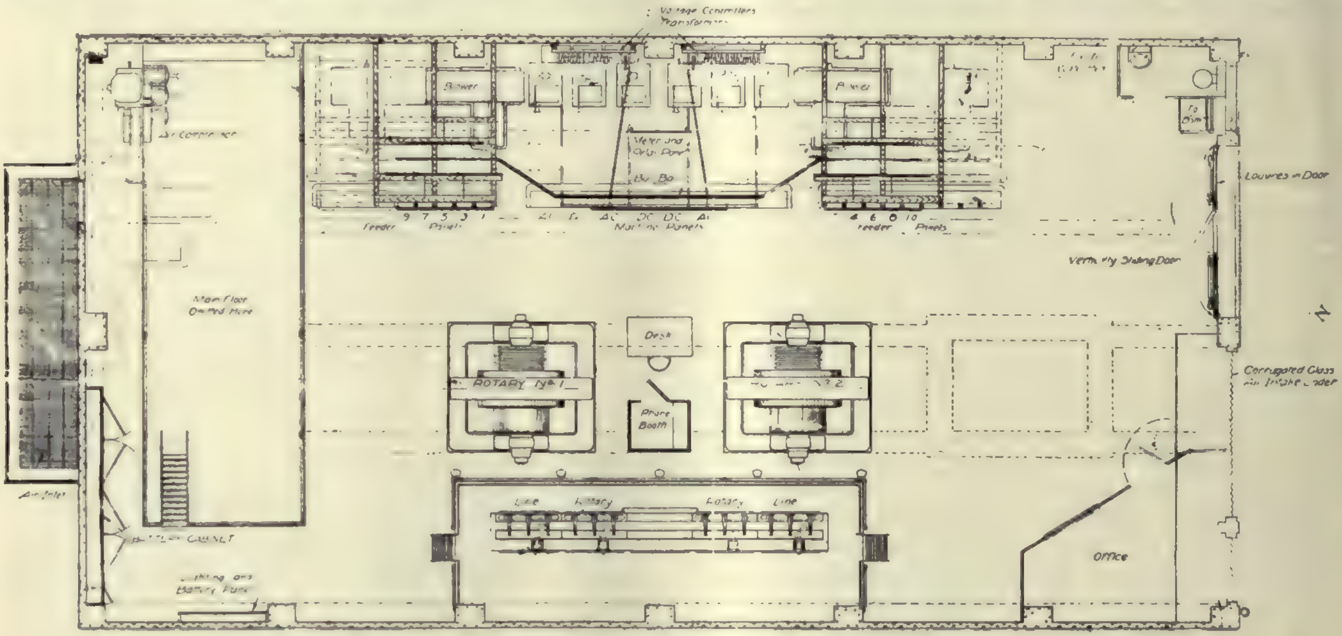
The equipment is designed to make it possible to alter the voltage under load conditions without power-factor variation. This is accomplished by taps in the primary windings of the step-down transfomers, these taps being brought out to step-by-step circuit-breaking contactors, manually operated, with auto-preventive reactances for maintaining the connections while stepping from tap to tap. The transformer ratio is changed 1½ per cent for each of eight steps, giving a total ratio range of 12 per cent. The transformer primaries are star-connected and the taps for this purpose are brought out at the neutral end of each primary, giving minimum voltage between the taps of the three phases and from contactors to ground. The transformers are of the air-blast type and all taps for this purpose are brought out through the tops of the transformers to controllers located immediately above them, giving a convenient accessible location in plain view for these devices "isolated by elevation." The transformers are located behind the main switchboard, and the voltage control is actuated by means of mechanical shafting from hand cranks on the face of the board.



SECTION OF STATION

Voltage control was considered desirable in this case because of the convenience of such control in the motor-generator stations of the same system and the inconvenience of the fixed voltage of converters as ordinarily equipped. One of the chief advantages of voltage control is the ability it gives to transfer load to or from other stations at will on trackage fed from more than one station. While such advantages would not warrant the cost and added losses of induction regulators or booster converters, they are held to warrant the added cost of the step-by-step arrangement, which was $2,650 per machine, factory cost.

The location of the equipment in the substation differs somewhat from the usual design, which is intended to convey the power generally in one direction from incoming high-tension source to outgoing direct-current delivery. Such an arangement involves considerable running around by the operator—from high-tension switch control to starting switch, to field switch, to direct-current panel, etc., which slows down restoration of power in emergencies. The substation here described is designed for operation by one man per shift; for this reason all operations are centralized so far as possible and all control is collected in the immediate neighborhood of the telephone booth, which is treated as the operating center when operation must be made most expeditious, as in emergencies. All high-tension disconnecting switches between the busbars and the oil switches, commonly called "bus disconnects," including the busbar sectionalizing switches, are located within convenient reach from the main floor and in plain view from the operating position. No switches whatever are mounted on the machines. Negative switches are omitted as unnecessary and (the machines being shunt wound) no equalizing switches are required. The field switches are located with the alternating-current starting switches on the main switchboard. On account of the large number of cables to each starting switch (fifteen, each 2,000,000 circ.mil in size) it is, of course, advisable to have the starting switches between the transformers and the converters, which results in locating the transformers behind the board. Congestion on and around the main switchboard is avoided by careful lay-outs of cable runs and by the removal from the board of all devices, such as meters and relays, which do not require handling in emergencies.



PLAN OF STATION AND ARRANGEMENT OF APPARATUS

The station is built for an ultimate capacity of four machines, of which two are now installed, the additional space being sufficient for two 3,000-kw. units, which would, if added, give a total capacity of 10,000 kw., sufficient for all probable downtown demand in San Francisco even with a subway under Market Street. In order to avoid an awkward location of the operating center, either with the initial or final equipment, the two machines first installed are located in the middle of the station with room for one additional at each end.

The converters face opposite to those in the usual design of substations, the collector ring end, instead of the commutator end, being toward the main working passageway and switchboard.

This is done to avoid risk to the operator and nervousness on his part from the danger of flashing under emergency conditions, such as cutting in machines on feeders which may be short circuited. The arrangement of the converters differs in another radical respect from the conventional, reverting to a practice abandoned for many years, in that the bed plates are set on timbers and insulated from ground. This has been done to eliminate the short-circuiting effect of flash-overs from positive brush rigging to pedestals or other portions of the frame and to cut out the severe burning that would otherwise occur in case of a breakdown from armature conductors to core. Each frame is grounded through an indicating lamp and suitable resistance to give notice in case of insulation failure. Risk of shock to operators from live frames is eliminated by the use of an insulating floor as described later.

Unusually convenient access to the lower half of the brush rigging is obtained by mounting the negative busbar in another location, by the omission of all shunts and by keeping all cables out of the way. A removable bench is provided to give a safe, convenient working platform under the commutators. The negative busbar is so assembled that it can be increased in section or extended in length without slacking off its connections.

The site selected for the station is a piece of property 41 ft. front by 80 ft. deep on a narrow back street, immediately next to Market Street. This site was owned by the United Railroads of San Francisco, being the location of an old horse-car stable of the Sutter Street line previous to the San Francisco fire. The building is reinforced concrete with no structural steel below the roof trusses. The problem of adequate lighting, always difficult on a site surrounded by private properties on three sides with a narrow street on the fourth, has been solved by making the whole of the roof of glass. Corrugated, wired glass was used for this purpose, set on one-quarter pitch with 2-in. slope lap, and has proved eminently satisfactory in every respect. There is no leakage in downpours or driving storms even though some sheets were cracked due to being set on non-parallel purlins and overloaded by weight of men working on them before the bad supporting conditions were noted. The roof does not sweat or let in too much heat under San Francisco climatic conditions. Direct sunlight is so diffused that there is no objectionable glare and the lighting on dark days is infinitely superior to that of any building with side windows or even with the ordinary skylights.

Ventilation is another feature requiring careful attention in a substation of this character, since the manufacturers refuse to design rotary converters with forced ventilation, leaving this as about the only class of electrical machinery to "stew in its own juice." The heated air is allowed to escape from this station through the sides of a monitor of the usual design, and cool air enters through louvers provided at both ends to admit air both above and below the main floor. This suffices for the two machines, but mechanically assisted draft will apparently be necessary for four.

The main door is made large enough to admit a converter assembled and the machines were shipped that way. To avoid waste of space with hinged doors and the cost of jack-knife or roller doors, the main door is mounted on vertical slides and is arranged to be lifted by the crane. No door latch or lock is required.

The air-blast pressure under the transformers is one ounce per square inch or about 150 lb. on the area of a door. A small air lock is provided with spring-hinged wickets in the inner and outer doors. The blower dampers are automatic.

An adjacent building was 2 in. away and it was considered advisable to leave no forms in the 2-in. space for fear of a complaint on the score of noise. The forms were ingeniously designed to allow their removal, which worked out successfully.

The location of the telephone booth in the operating center between the two machines necessitated special soundproofing. The booth is of single wall construction, lined with 1 in. of hair felt with an inner lining of wallboard. The inner windows are celluloids, the joint of the door is weather-stripped, the booth is mounted on rubber posts and the floor covered with a rubber mat. The result is almost absolute quiet.

The main floor is finished with 1 in. of Trinidad Lake asphalt mastic, which was preferred to concrete as less slippery, less dusty and softer under foot. The writer has taken 11,000 volts from hand to ground standing on this floor without sensation except when taking hold of and letting go the circuit.

The high-tension bus structure with all barriers is concrete cast in one pouring. Its longitudinal wall runs up between the line and bus terminals of the motor-operated oil switches, thus keeping any fireworks on the line side from spreading to the bus side. The oil-switch cells have removable doors back and front to provide for easier maintenance and quick cleaning up after breaking heavy loads.

The outside disconnecting switches are double throw with triple-pole, rod-operated short-circuiting and grounding switches that can only be closed on the back throw when the line is disconnected from the house. This does away with the need of the usual dangerous grounding wire.

All outgoing direct-current feeder panels and circuit-breaking equipment are mounted on timber frame work of mill construction in place of the conventional grounded steel frames. This has been done to avoid the chance of short circuit from positive busbar or bare copper connections to the steel frame when working on live circuits. Since the feeders in a downtown district must always be energized and can never be shut down even during the midnight hours on account of "owl-car" service, this precaution is a decided safety-first advantage. On account of the severe circuit-breaker duty occasioned by low feeder resistance to the trolley network, the circuit breakers are not mounted as usual on the feeder panels, where they would be immediately above the head of the man operating them. They are located in two rows above and behind the feeder switchboards, the double row allowing the breakers to be located on 32-in. centers with the panels on the usual 16-in. centers. Transite barriers are mounted between the breakers, thus isolating each breaker in a cubicle or cell somewhat similar to the cells provided for high-tension oil switches, but open at the top, front and bottom. In case repairs are required or burned-out breakers must be replaced, the operator can work in such a cell with its timber frame, slate and transite walls in comparative safety and is not endangered by accidental grounds or arcing from adjacent breakers.

In addition to the usual 600-volt main busbar, the feeder panels are equipped with what is termed a "hospital bus" supplied from the main busbar through a spare circuit breaker. Each feeder switch is double throw so that any feeder can be connected via the hospital bar to the spare breaker. All feeders can be interconnected through the hospital bus at times of light loads when the station is shut down, thus allowing the main 600-volt busbar to be de-energized for work on same or on the circuit breakers. Each feeder is equipped with a pilot lamp and suitable resistance to indicate approximate voltage delivered via multiple connections from other stations. This detail was specified in place of the usual voltmeter plug, as it was found that operators will not take the time to plug in a voltmeter on a cut-out feeder, but will cut in in a hurry to catch the cars before they slow down, with serious results at times.

In order to ring a gong when the breaker opens, each feeder breaker is equipped with an auxiliary switch, serially connected to another auxiliary switch actuated by the corresponding feeder switch which stops the gong when the latter switch is opened. All switches and breakers have laminated studs.

The direct-current feeders are $\frac{5}{32}$-in. paper-lead cables varying in size from one of 750,000 circ.mils to three cables per feeder each of 1,500,000 circ.mils. Total positive outgoing copper is 17,250,000 circ.mils and negative current is returned by eight 2,000,000-circ.mil bare cables drawn into fiber ducts.

### SWITCHBOARD DETAILS SIMPLIFIED

The line and converter switchboard has been simplified by the omission of several items often used but found unnecessary. No direct-current starting equipment has been provided, since with the variable voltage alternating-current starting is always reliable. Instruments have been kept to a minimum. Each incoming line has pilot lamps and an ammeter only. Each converter has a reactive factor indicator on the low-tension side and a direct-current ammeter only. The main direct-current voltmeter has a suppressed zero to give an open scale. A 200-volt center-zero voltmeter is provided to show polarity and can be switched from either converter to positive busbar to serve as a paralleling voltmeter to avoid plugging a voltmeter from bus to machine and vice versa. Lamps are connected from the voltmeter bus to the battery to give a check test on polarity or to serve if the polarity indicator is out of commission.

All connections between transformers, converters and switchboards are made with 2,000,000 circ.mil cables, two per phase and four per direct-current terminal, making twenty such cables to each converter. The cable racks are hardwood, held to steel straps by studs and malleable washers. The studs between phases of the alternating-current conductors are brass, all others including those between cables of the same phase, steel. All cable lugs were sweated on the ends of the cables, standing up in position.

The cost of the development, including transmission lines paid for by the company, was as follows:

| | |
|---|---|
| Building | $51,000 |
| Equipment, f.o.b. factory | 76,000 |
| Freight and installation | 21,000 |
| Conduits and manholes | 33,500 |
| Cables, positive, installed | 32,000 |
| Cables, negative, installed | 7,500 |
| Transmission lines supplying | 75,000 |
| Engineering and overhead | 40,000 |
| Total | $336,000 |

Automatic protective features are as follows:

The machine circuit breakers are equipped with alternating-current low-voltage release attachments connected to centrifugal speed-limit switches and direct-current, reverse-current relays. The alternating-current converter switches are equipped with inverse time-limit overload and instantaneous low-voltage relays, the incoming lines with reverse-power relays.

Plug switches are provided by means of which the winding of any relay may be energized from toy transformers with an overload current capable of adjustment, and in the case of the incoming lines with the proper phase and polarity. Thus the complete test of any relay may be made a routine operation.

The watt-hour meters are connected to triple-pole, double-throw switches for testing purposes, which accomplish the following results: First, the current transformer secondaries are cut off from the meters without opening the circuits of the current transformers, but leaving the current coils of the watt-hour meters open. The potential coils of the two torque elements of the meter are connected in multiple and the current coils in series. As a result, either with meter in service or out of service, the meter tester may, from the front of the board, make all necessary connections for the supply of and delivery from a phantom load, for testing each torque element of the meter and for making a check test on the two torque elements in series. The switch may then be sealed in the running position. An indicating lamp is connected across each potential coil of each meter to give notice of the blowing of any fuse, either primary or secondary.

Current for lighting the station is taken from the direct-current busbars as being the most continuously energized part of the network. At night the station is closed down and all alternating-current equipment is disconnected for a general clean-up by the night shift. All direct-current lighting circuits consist of four 115-volt lamps in series charging the control storage battery. No other charging equipment is required. A low-voltage release is so connected as automatically to light from the battery a sufficient number of lamps to illuminate the control center when direct-current power fails at night.

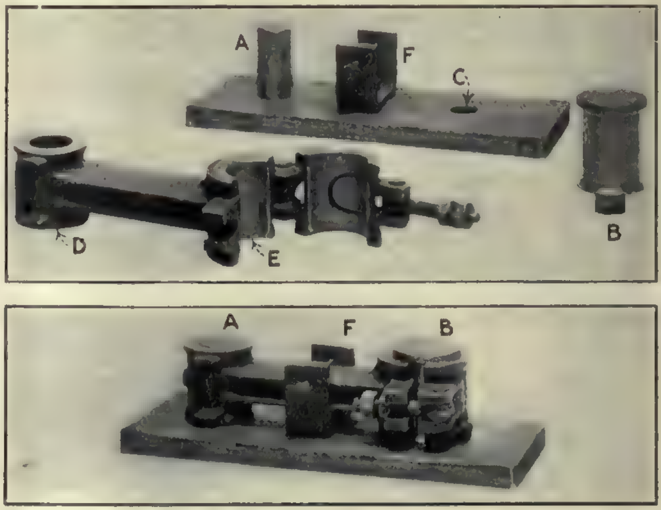
The converters, transformers and direct-current switchboards are of Westinghouse manufacture. The high-tension switching equipment is General Electric.

The station was designed for the United Railroads of San Francisco by Ford, Bacon & Davis, consulting engineers, who also superintended the construction of the building and of the conduit system required therewith and the installation of all equipment, cables, etc.

## Jig for Rebabbitting Compressor Connecting Rods

**The Babbitting of Compressor Connecting Rods Is Facilitated and Proper Alignment and Fit Are Assured by the Use of a Simple Jig**

ACCOMPANYING illustrations show a form of jig used by the Ohio Electric Railway for rebabbitting the connecting rods of its compressors. The jig consists of a base on which is mounted a pin, *A*, a clamp, *F*, and a socket hole, *C*, for holding the pin *B*. In babbitting a connecting rod, it should first be fitted with a suitable bushing at the closed end *D*, so as to provide a close fit on the piston wrist pin. This closed end is then placed over the pin *A* as shown. Next the pin *B* is set in its socket hole at *C* and the open end of the connecting rod is adjusted by means of the clamp *F* until the pin *B* comes centrally with the hole to be rebabbitted. Cardboard fillers are used between the halves of housing to prevent the two halves from being cast in one piece, and also to prevent the babbitt from running out. Fire clay is used to stop up the bottom and thus insure all openings being properly closed to prevent any babbitt running out. The pin *B* should be a rather loose fit in the hole of the socket *C*, as it is necessary to lift this pin out of its socket in order to remove the connecting rod after babbitting, and the heat from the babbitt will expand this somewhat. The oil groove shown in the connecting rod of the accompanying illustration was cut by hand, but this can be readily cast by having a suitable raised form on the pin *B*, in which case some kind of a dowel or key should be put on the stem *B* to insure that the oil groove comes in the right place each time.



TOP VIEW, JIG WITH CONNECTING ROD AFTER BEING BABBITTED. BOTTOM VIEW, CONNECTING ROD IN POSITION READY FOR THE POURING OF THE BABBITT

The use of this jig in the shop of the Ohio Electric Railway has considerably reduced the time necessary for babbitting connecting rods, and accurate fits have increased the time necessary between rebabbitting.

# Springs for Easy Riding Cars

### The Ratio of the Dead Load to the Live Load and that of Maximum Load to Average Load Are Factors that Give Great Difficulty in Designing Springs with Easy Riding Qualities

BY L. F. SEELAR
Chief Engineer St. Louis Car Company

THE selection of springs is one of the most difficult tasks which confronts the designer of trucks for street and interurban cars. On the heavier coaches used in railway service, the proportion of live or passenger load is so small, compared with the total weight of the equipment, that this difference plays but a small part in the selection of the spring. It is not unusual to find that the weight imposed upon the bolster spring by the light body amounts to but one-sixth of the capacity of the spring, and that the passenger or live load will amount to less than one-eighth of the light weight of the body. Under such conditions, it is a matter of no great difficulty to select springs that will give easy riding and have long life.

When we enter the field of street car design, we meet a totally different condition. The day has long passed since weight in car bodies was a matter of minor importance. For the past ten years it has steadily been impressed upon the car builder and designer, by the operating officials, that weights should be kept to a minimum. This reduction of weight probably reached its climax in the bringing forth of the safety car, in which the relation between the weight of the car body and that of the passenger load is equal one to the other. In this car the seated passenger load is equivalent to one-third the weight of the car body, and as it is not unusual for street cars to carry twice their seating capacity, it will readily be seen that the weight of car to passenger will often be as three is to two, and on occasions, no doubt, it is as one is to one. It is this condition, which reaches its maximum in the safety car (ratio of dead load to live load), that causes the greatest difficulty in designing springs that will give easy riding qualities, both when the car is only carrying the average load and when loaded to its maximum capacity.

It has become almost standard practice to design the bolster springs in double trucks for a height of 10½ in. under the weight of the body. Conditions imposed in maintaining step heights on street cars make it almost impossible to increase this dimension. At the same time, owing to the maintenance of clearance between the various parts of equipment, it is very difficult to obtain more than 2 in. of deflection of the car body between its height without load and with maximum load.

It is the usual practice to design truck parts so as to give a clearance of 3 in. with the car body light and 1 in. with car body and maximum load. This inch of clearance is often found to have entirely disappeared after cars have been in service from one to two years, due to wear of the various parts, and in exceptional cases this clearance has disappeared within six months. The spring designer must have a lively appreciation of the foregoing conditions, if he is to meet with success in providing a spring to carry minimum and maximum load and maintain comfort of the public.

For a long period of time I have assumed that a deflection of car body of 1 in. for each 10,000 lb. of load imposed would give easy riding, and insure a spring capacity tending to long life of truck parts. This rule cannot, however, be followed in many double-truck street cars that have recently been built. There are a number of cars now in service in which the body weight runs from 18,000 to 22,000 lb. and the maximum passenger load runs from 20,000 to 25,000 lb. As it is necessary to maintain at least ¾ in. between the bands of the springs with the fully-loaded car; and as the passenger load would, according to the foregoing rule, give a deflection of 2 to 2½ in., it is apparent that the deflection of the spring would be from 2¾ in. to 3¼ in., a condition that can very seldom be permitted. Where the rule of 1 in. deflection for each 10,000 lb. of load has been consistently followed, there have been very few complaints of cars riding hard and the springs have stood up remarkably well in service.

It has long been good practice to load bolster springs in double-truck cars and side springs in single-truck cars at two-thirds of their capacity; that is, with a car body weighing 20,000 lb., which is subjected to a maximum passenger load of 20,000 lb., the spring capacity is 60,000 lb.

As the average load carried by street cars is about one-half the seating capacity or one-sixth of the maximum load, which is imposed for a very short period of time (about two hours in eighteen), springs for street cars can be figured at higher limits than those mentioned, though it is never safe to go over 80 per cent of the capacity of the spring.

## METHODS OF CONSTRUCTING SPRINGS FOR EASY RIDING

In order to maintain easy riding under the conditions outlined, four courses are open:

1. To put in plates of varying thicknesses. In cases of this kind it is customary to make the first and second plates heavier than the others. Where this is done there is a compound fiber stress set up which is hard to determine, and as the capacity of the spring is directly proportional to the square of the thickness of the plates, it is a difficult matter accurately to calculate deflections. This method should never be followed where any of the three others can possibly be used.

2. To place auxiliary plates within the main spring. When this is done the main spring is calculated to carry the weight of the car body and the seated passengers. The auxiliary spring is then designed to care for the standing passengers and road shocks. The two springs must be so proportioned that the deflection of the main spring with maximum load will never be exceeded. Therefore, to obtain this end it is necessary that the auxiliary spring be short and composed of very heavy plates.

3. To build up a spring of a large number of thin

plates. This spring is open to the objection of a large total deflection, though it gives the greatest flexibility and, therefore, is very easy riding.

4. To use a maximum fiber stress of 120,000 lb. instead of the 80,000 lb. formerly used.

For a great many years 80,000 lb. was considered as the elastic limit of spring steel. Modern heat treatment, however, has shown that this value can be increased, and it is possible by heat treating ordinary spring steel to obtain elastic limits of from 135,000 lb. to 250,000 lb. It is not unusual to find spring manufacturers demanding steels with an elastic limit of from 135,000 lb. to 150,000 lb. It is this ability to increase the elastic limit by heating treatment that enables us to design springs that are light in weight with deflection that will satisfy the mechanical limitations imposed, as by using a maximum fiber stress of 120,000 lb. instead of the 80,000 lb. formerly used, the weight of the spring is reduced and the deflection increased. This means that a few very thick plates will give the same riding qualities as were formerly obtained from a great many thin plates. It also makes it possible to reduce the size of the spring, as the strength of a spring is directly proportional to the square of the thickness of its plates, *i.e.*, a spring 30 in. long with four plates 3 in. x ¼ in. is only one-quarter as strong as a spring 30 in. long with four plates 3 in. x ½ in., or stating it differently, one ½-in. plate is equivalent to four ¼-in. plates. This gives a 50 per cent reduction in weight and volume. It is also true that the deflection of springs is proportional to the thickness of the plates so that the deflection of the ½-in. plates is one-half that of the ¼-in. plate under the same load.

With the foregoing facts in mind, it is a comparatively simple matter to design a spring that will give nearly the same riding qualities as were formerly obtained and at the same time approximate the same factors of safety as used heretofore—and as will be shown by the following example:

Assuming a car body which will weigh 18,000 lb. and seat sixty persons at an average weight of 150 lb. each, we have a ratio of live to dead load of 1:2, and as this car will carry during rush hours from 100 to 120 persons, live load can very well equal or exceed the dead load. As the springs must be designed to meet the worst condition and as the total expected load would be 36,000 lb., the springs should have a capacity of 3 × 36,000 ÷ 2 or 54,000 lb. in order not to exceed the limit previously set as desirable.

By using the high fiber stress of 120,000 lb. and heat treating the spring to raise its elastic limit, we would only have a fiber stress of 80,000 lb. in the spring, due to load with maximum loading and have one-third of its capacity to absorb road shocks as at present. As the average load is less than one-half the seating capacity of the car, the fiber stress in the spring due to load would only be 42 per cent of the capacity of the spring. Cars usually operate eighteen hours per day, and are seldom worked to capacity for more than two hours per day, so that there is ample time to recover from any fatigue set up in the period of maximum loading.

The second consideration of design is that of deflection. As we are assuming a spring with plates of uniform thickness and having a limitation of 2-in. deflection from light to full load, this fixes the deflection from free to light load height as the deflection will be directly proportional to the load imposed.

Assuming the maximum passenger load at three times the seating capacity, we have a live load of 180 × 150 lb. or 27,000 lb., with a 2-in. deflection; this would mean a load of 13,000 lb. per inch. As the car body weighs 18,000 lb., the deflection under light load would be in the ratio—1:13,000 = X:18,000 or 1.384. Again assuming that the spring will stand 10½ in. high under light car body, we have a free height of 11⅞ in. or 12 in. As the capacity of the spring is 54,000 lb. and the deflection ratio is 13,000 lb. per inch, the total allowable deflection would be 54,000/13,000 = 4.154 in. and the distance between bands with light car would be 4.154 in. less 1.384 in. or 2.77 in.—say 2¾ in. for deflection under live load and shock.

### DETERMINING THICKNESS OF THE PLATES

We can now determine the total allowable thickness of the plates composing the spring by adding to the deflection for live load 2.77 in., the thickness of bands (usually ¾ in. each) 1½ in. and deducting the same from the light load height of 10½ in., which gives 10.5 in. less 2.77 in. + 1.5 in. or 6.23 in. for two halves or 3.12 for one side of the elliptic spring.

We are now ready to consider the third point of design—that of length. In order to gain easy riding a spring must have maximum deflection. Deflection is proportional to the square of the length so that a spring should have the greatest possible length, consistent with the maximum permissible deflection. As a rule, there are as many mechanical limitations to the length of the spring as there are to its height and they are ordinarily made from 28 in. to 36 in. long. Assuming a length of 31 in. with 3-in. bands, we have an effective length of spring of 28 in. The width of springs may be determined by available space or by requirements as to capacity. Car springs are usually 3 in. wide and we will use this width in the design of the assumed spring.

Having determined the limiting features of the spring, we are ready to begin its detail design:

1. It must have a capacity of 54,000 lb./4.
2. The deflection should not be more than 4.154 in.
3. Its effective length should be 28 in.
4. The total thickness of plates cannot exceed 3.12 in.
5. The width of spring is 3 in.

Since the capacity of the spring plates is proportional to the square of their thickness, and the stiffness of the spring is affected by the number of plates, it is necessary to find the greatest number of plates that can be used in order to give the required capacity in the space available.

By using a spring plate 1/16 in. thick and 1 in. wide as a basis of comparison and considering the available space as occupied by a single plate we can obtain, first, the number of plates and, second, their thickness. "Machinery's Hand Book," page 421, gives the capacity of a spring 1 in. long, 1 in. wide and 1/16 in. thick as 208 lb. with a fiber stress of 80,000 lb. With a fiber stress of 120,000 lb. its capacity would be 50 per cent greater or 312 lb. Since the length is 28 in. its capacity would be 312/28 or 11.14 lb.

The total thickness of all plates being 3.12 in. or 50/16 nearly the capacity of a single plate spring would be $50^2$ × 11.14 or 27,850 lb. With spring plates 3 in. wide the capacity will be 27,850 × 3 or 83,550 lb.

Since the load (54,000 lb.) is distributed over four springs, each will sustain one-fourth of the total or

13,500 lb., and the total capacity of one spring plate divided by this sum will give the required number of plates—thus, 83,550/13,500 = 6.2, and dividing the allowable thickness, 3.12 by the number 6.2 will give the thickness of each plate—3.12 in./6.2 = 0.5 in. Again comparing capacity with the 1/16-in. spring plate, we find that the capacity of the ½-in. plate is as the square of 1 is to 8 and that the capacity of the spring is therefore 64 × 6 × 3 × 11.14 or 12,833 lb., which is within 5 per cent of the desired capacity and is as close a result as it is ordinarily possible to attain.

It now only remains to check the deflection. This can be done by the use of the formula $F = SL^2/2Eh$, in which $S$ equals stress per square inch, $L$ the effective length of spring in inches, $E$ the modulus of elasticity, 30,000,000 lb., and $h$ the thickness of the spring plate. Or by means of the table given on page 421 of "Machinery's Hand Book," which gives the deflection for ½-in. plates as 0.00157 at 80,000 lb. fiber stress or 0.002355 for 120,000 lb. fiber stress. This constant multiplied by the square of the length (28 in.) will give the deflection for one-half of the spring—therefore, the deflection is equal to 2 × 784 × 0.00235 or 3.68 in. or a deflection within 3 per cent of that desired.

We can write a comparative specification showing qualities desired against those obtainable:

| | Desired, In. | Obtainable In. |
|---|---|---|
| Number of plates | 6 | 6 |
| Width of plates | 3 | 3 |
| Thickness of plates | ½ | ½ |
| Length—center line of bolt | 31 | 31 |
| Width of band | 3 | 3 |
| Thickness of band | ⅜ | ⅜ |
| Capacity | 13,500 | 12,833 |
| Total deflection | 4.15 | 3.68 |
| Free height | 11⅞ | 11¾ |
| Height with car body | 10½ | 10½ |

The results obtainable are as close to those desired as it is possible to attain in manufacturing so that a spring can be made with a reasonable certainty of its satisfactory performance.

## Results from Cadmium-Copper Trolley Wire

THE Eugene F. Phillips Electrical Works, Ltd., Montreal, Canada, has given out some results of a test of its cadmium-copper trolley wire on the lines of the Winnipeg Electric Railway. A curve with very heavy traffic was equipped for this test. One track was strung with copper trolley wire and the adjacent track with cadmium-copper wire, each being No. 00 and having a normal diameter of 365 mils. Both wires were installed on May 8, 1919.

On Dec. 21, 1919, after being in service 228 days, the maximum wear on the copper wire was 60 mils or 16.44 per cent, and on the cadmium-copper wire 20 mils or 5.48 per cent. The average wear on the copper wire was 20 mils or 5.48 per cent and on the cadmium-copper wire 5 mils or 1.3 per cent.

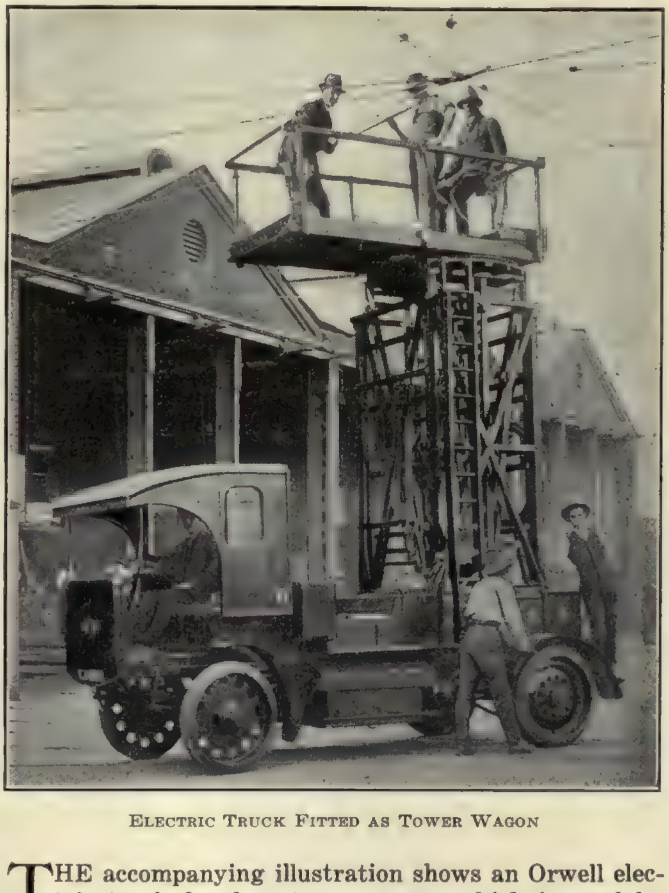
On May 8, 1920, after service of one year, the average wear on the copper wire was 45 mils or 12.3 per cent and on the cadmium-copper wire 15 mils or 4.1 per cent. On Dec. 29, 1920, after 602 days' service, the maximum wear on the copper wire was 115 mils or 31.5 per cent and on the cadmium-copper wire 30 mils or 8.2 per cent. On this basis the copper wire was considered as worn out and was removed and renewed with new copper wire. On May 8, 1921, the diameters were again measured, after 730 days' service of the cadmium-copper wire and 130 days' service of the replaced copper wire. The maximum wear on the cadmium-copper wire was 40 mils and on the replaced copper wire 20 mils, the averages being 30 and 12 mils respectively.

TEST ON CADMIUM-COPPER TROLLEY WIRE

| Size B & S | Breaking Weight, Lb. | Tensile Strength Lb. per Sq.In. | Elongation in 10 In. Per Cent | Conductivity, Per Cent |
|---|---|---|---|---|
| 0000 | 8,890 | 53,500 | 6.5 | 93.3 |
| 000 | 7,100 | 54,100 | 6.3 | 92.7 |
| 00 | 5,905 | 56,500 | 6.0 | 92.6 |
| 0 | 4.778 | 57,600 | 5.5 | 92.5 |

Results from these tests show that the cadmium-copper wire has superior wearing qualities, and its conductivity averages 92.7 per cent of the international annealed copper standard. Tests of tensile strength, elongation and conductivity are given in the accompanying table. These tests were made by McGill University. The results indicate that the tensile strength of the cadmium-copper wire is from 6 to 9 per cent higher than that of hard-drawn copper and the conductivity is 3½ to 4½ per cent lower.

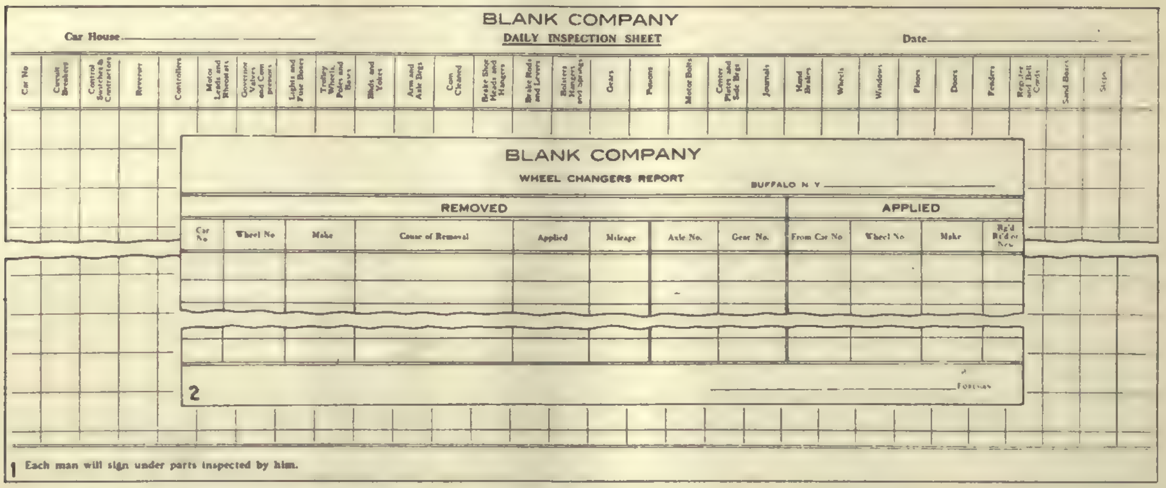
## Electric Tower Wagon



ELECTRIC TRUCK FITTED AS TOWER WAGON

THE accompanying illustration shows an Orwell electric truck fitted as tower wagon which is used by the Johannesburg, South Africa, municipality for electric railway work. The speed of this truck is about 20 m.p.h. and it has an operating range of about 50 miles. The distance which can be operated per charge has been sacrificed for speed, as the truck can be recharged whenever it is not in actual service. This truck is being tried somewhat in the nature of an experiment, as the municipality now uses gasoline-driven trucks, and if it proves entirely satisfactory it is contemplated to buy other electric trucks for the work.

# Convenient Forms for Recording Inspection and Overhauling Work



BLANK COMPANY

DAILY INSPECTION SHEET

Car House

Date

| Car No | Circuit Breakers | Control Switches & Contactors | Reverser | Controllers | Motor Leads and Rheostats | Governor Valves and Compressors | Lights and Fuse Boxes | Trolley Wheels, Poles and Bases | Bkts and Yokes | Arm and Axle Brgs | Com Cleaned | Brake Shoe Heads and Hangers | Brake Rods and Levers | Bolsters Hangers and Springs | Gears | Pinions | Motor Bolts | Center Plates and Side Brgs | Journals | Hand Brakes | Wheels | Windows | Floors | Doors | Fenders | Register and Bell Cords | Sand Boxes | Steps |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

1 Each man will sign under parts inspected by him.

BLANK COMPANY

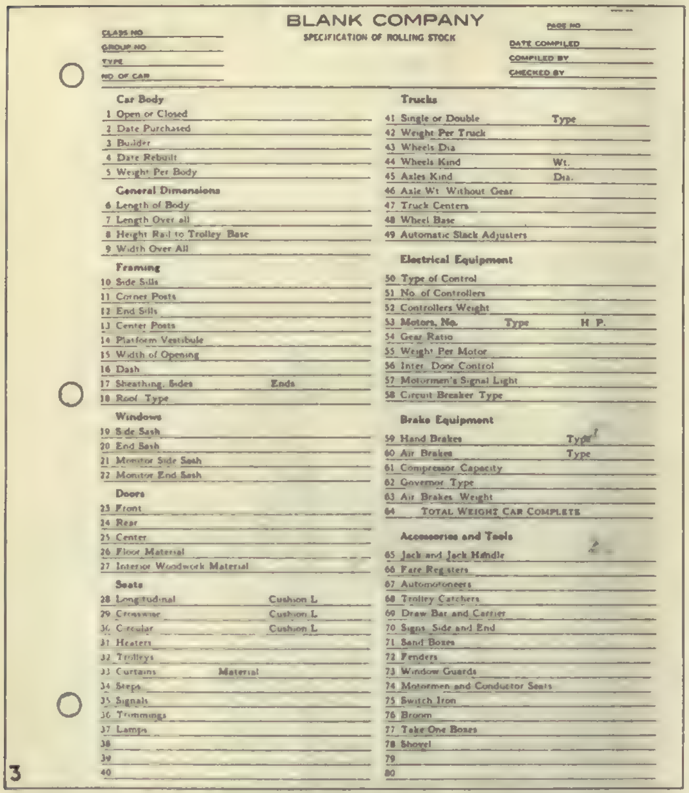
WHEEL CHANGERS REPORT

BUFFALO N Y

| REMOVED | | | | | | | | APPLIED | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Car No | Wheel No | Make | Cause of Removal | Applied | Mileage | Axle No. | Gear No. | From Car No | Wheel No | Make | Rg'd Bt'd or New |
| | | | | | | | | | | | |

Foreman

2



BLANK COMPANY

SPECIFICATION OF ROLLING STOCK

CLASS NO

GROUP NO

TYPE

NO OF CAR

PAGE NO

DATE COMPILED

COMPILED BY

CHECKED BY

**Car Body**

1 Open or Closed
2 Date Purchased
3 Builder
4 Date Rebuilt
5 Weight Per Body

**General Dimensions**

6 Length of Body
7 Length Over all
8 Height Rail to Trolley Base
9 Width Over All

**Framing**

10 Side Sills
11 Corner Posts
12 End Sills
13 Center Posts
14 Platform Vestibule
15 Width of Opening
16 Dash
17 Sheathing, Sides Ends
18 Roof Type

**Windows**

19 Side Sash
20 End Sash
21 Monitor Side Sash
22 Monitor End Sash

**Doors**

23 Front
24 Rear
25 Center
26 Floor Material
27 Interior Woodwork Material

**Seats**

28 Longitudinal Cushion L
29 Crosswise Cushion L
30 Circular Cushion L
31 Heaters
32 Trolleys
33 Curtains Material
34 Steps
35 Signals
36 Trimmings
37 Lamps
38
39
40

**Trucks**

41 Single or Double Type
42 Weight Per Truck
43 Wheels Dia
44 Wheels Kind Wt.
45 Axles Kind Dia.
46 Axle Wt Without Gear
47 Truck Centers
48 Wheel Base
49 Automatic Slack Adjusters

**Electrical Equipment**

50 Type of Control
51 No. of Controllers
52 Controllers Weight
53 Motors, No. Type H P.
54 Gear Ratio
55 Weight Per Motor
56 Inter. Door Control
57 Motormen's Signal Light
58 Circuit Breaker Type

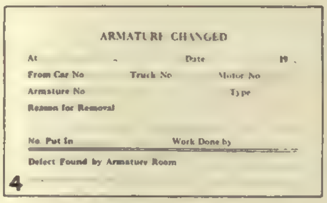
**Brake Equipment**

59 Hand Brakes Type
60 Air Brakes Type
61 Compressor Capacity
62 Governor Type
63 Air Brakes Weight
64 TOTAL WEIGHT CAR COMPLETE

**Accessories and Tools**

65 Jack and Jack Handle
66 Fare Registers
67 Automotoneers
68 Trolley Catchers
69 Draw Bar and Carrier
70 Signs Side and End
71 Sand Boxes
72 Fenders
73 Window Guards
74 Motormen and Conductor Seats
75 Switch Iron
76 Broom
77 Take One Boxes
78 Shovel
79
80

3



ARMATURE CHANGED

At Date 19

From Car No Truck No Motor No

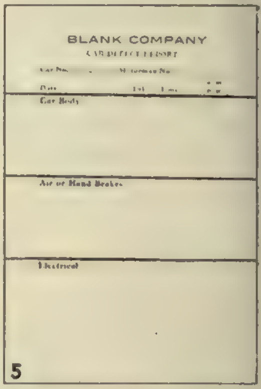
Armature No Type

Reason for Removal

No. Put In Work Done by

Defect Found by Armature Room

4



BLANK COMPANY

[illegible]

Car No. Motorman No

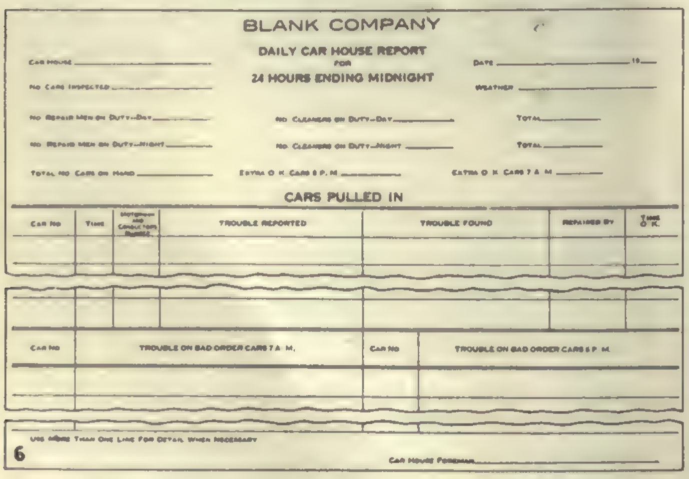
Date

Car Body

Air or Hand Brakes

Electrical

5



BLANK COMPANY

DAILY CAR HOUSE REPORT
FOR
24 HOURS ENDING MIDNIGHT

CAR HOUSE

DATE 19

NO CARS INSPECTED

WEATHER

NO REPAIR MEN ON DUTY—DAY

NO CLEANERS ON DUTY—DAY

TOTAL

NO REPAIR MEN ON DUTY—NIGHT

NO CLEANERS ON DUTY—NIGHT

TOTAL

TOTAL NO CARS ON HAND

EXTRA O K CARS 6 P. M

EXTRA O K CARS 7 A M

CARS PULLED IN

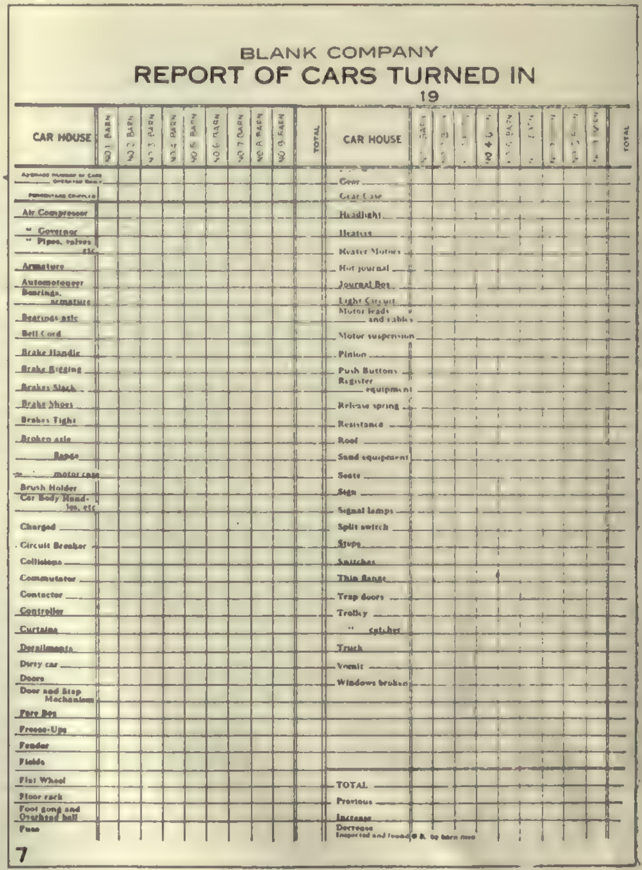
| CAR NO | TIME | MOTORMAN AND CONDUCTOR NUMBER | TROUBLE REPORTED | TROUBLE FOUND | REPAIRED BY | TIME O K. |
|---|---|---|---|---|---|---|
| | | | | | | |

| CAR NO | TROUBLE ON BAD ORDER CARS 7 A. M. | CAR NO | TROUBLE ON BAD ORDER CARS 6 P. M. |
|---|---|---|---|
| | | | |

USE MORE THAN ONE LINE FOR DETAIL WHEN NECESSARY

CAR HOUSE FOREMAN

6



BLANK COMPANY

REPORT OF CARS TURNED IN

19

| CAR HOUSE | NO 1 BARN | NO 2 BARN | NO 3 BARN | NO 4 BARN | NO 5 BARN | NO 6 BARN | NO 7 BARN | NO 8 BARN | NO 9 BARN | TOTAL | CAR HOUSE | [illegible] | [illegible] | [illegible] | NO 4 [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Average number of cars operated daily | | | | | | | | | | | Gear | | | | | | | | | | |
| [illegible] | | | | | | | | | | | Gear Case | | | | | | | | | | |
| Air Compressor | | | | | | | | | | | Headlight | | | | | | | | | | |
| " Governor | | | | | | | | | | | Heaters | | | | | | | | | | |
| " Pipes, valves etc | | | | | | | | | | | Heater Motors | | | | | | | | | | |
| Armature | | | | | | | | | | | Hot journal | | | | | | | | | | |
| Automotoneer | | | | | | | | | | | Journal Box | | | | | | | | | | |
| Bearings, armature | | | | | | | | | | | Light Circuit | | | | | | | | | | |
| Bearings axle | | | | | | | | | | | Motor leads and cables | | | | | | | | | | |
| Bell Cord | | | | | | | | | | | Motor suspension | | | | | | | | | | |
| Brake Handle | | | | | | | | | | | Pinion | | | | | | | | | | |
| Brake Rigging | | | | | | | | | | | Push Buttons | | | | | | | | | | |
| Brakes Slack | | | | | | | | | | | Register equipment | | | | | | | | | | |
| Brake Shoes | | | | | | | | | | | Release spring | | | | | | | | | | |
| Brakes Tight | | | | | | | | | | | Resistance | | | | | | | | | | |
| Broken axle | | | | | | | | | | | Roof | | | | | | | | | | |
| " flange | | | | | | | | | | | Sand equipment | | | | | | | | | | |
| " motor case | | | | | | | | | | | Seats | | | | | | | | | | |
| Brush Holder | | | | | | | | | | | Sign | | | | | | | | | | |
| Car Body Handles, etc | | | | | | | | | | | Signal lamps | | | | | | | | | | |
| Charged | | | | | | | | | | | Split switch | | | | | | | | | | |
| Circuit Breaker | | | | | | | | | | | Steps | | | | | | | | | | |
| Collisions | | | | | | | | | | | Switches | | | | | | | | | | |
| Commutator | | | | | | | | | | | Thin flange | | | | | | | | | | |
| Contactor | | | | | | | | | | | Trap doors | | | | | | | | | | |
| Controller | | | | | | | | | | | Trolley | | | | | | | | | | |
| Curtains | | | | | | | | | | | " catcher | | | | | | | | | | |
| Derailments | | | | | | | | | | | Truck | | | | | | | | | | |
| Dirty car | | | | | | | | | | | Vomit | | | | | | | | | | |
| Doors | | | | | | | | | | | Windows broken | | | | | | | | | | |
| Door and Step Mechanism | | | | | | | | | | | | | | | | | | | | | |
| Fare Box | | | | | | | | | | | | | | | | | | | | | |
| Freeze-Ups | | | | | | | | | | | | | | | | | | | | | |
| Fender | | | | | | | | | | | | | | | | | | | | | |
| Fields | | | | | | | | | | | | | | | | | | | | | |
| Flat Wheel | | | | | | | | | | | TOTAL | | | | | | | | | | |
| Floor rack | | | | | | | | | | | Previous | | | | | | | | | | |
| Foot gong and Overhead bell | | | | | | | | | | | Increase | | | | | | | | | | |
| Fuse | | | | | | | | | | | Decrease<br>Inspected and found O.K. to turn over | | | | | | | | | | |

7

1. Daily inspection sheet.
2. Report of wheels changed.
3. Specification of rolling stock.
4. Report of armature changes.
5. Car defect report.
6. Daily record of cars pulled in.
7. Summary of cars turned in

# Systematic Maintenance Good Investment

### Methods Used and Results Obtained by One Large Railway Indicate that Careful Attention to Maintenance Details Produces Most Satisfactory Conditions—Concrete Example Discussed, Using Data Gathered from a Survey of the Shops and Records

BY JOHN S. DEAN
Railway Motor Engineering Department, Westinghouse Electric & Manufacturing Company

IN ANY CAMPAIGN for increased revenues one important item which must not be overlooked is the possible economies which might be effected by certain changes or improvements in operating methods. To assist in pointing out some of the possibilities along this line a concrete example will be discussed, using data and figures gathered from a survey of the shops and records of one of the large railway operating companies with the following characteristics:

Service.—City of 500,000 population and interurban service to adjoining towns.

Miles of Track.—City, 230 miles; suburban and interurban, 204 miles.

Passengers carried per year, 227,000,000.

EQUIPMENT

| | | | |
|---|---|---|---|
| Passenger | Motor cars | 815 city | 351 quadruple equipment<br>468 double equipment |
| | | 84 interurban—quadruple equipment | |
| | | 23 suburban—quadruple equipment | |
| | | 4 special | 3 quadruple equipment<br>1 double equipment |
| | Trail cars | 19 city<br>4 suburban | |
| Service | Motor cars | 60 snowfighting equipments<br>3 electric locomotives<br>53 freight, track department, sand, etc. | |
| | Trail cars | 75 flat, dump, etc. | |

SHOP AND CARHOUSE EMPLOYEES

| | | Men |
|---|---|---|
| Main shops | Electrical department | 45 |
| | Mechanical department | 29 |
| | Air brake department | 16 |
| | Erecting department | 22 |
| | Wood-working department | 78 |
| | Painting department | 25 |
| | Reclamation department | 22 |
| | Total | 237 |

| | | Cars | Men | Cars per Man |
|---|---|---|---|---|
| Carhouses | No. 1 Station | 228 | 62 | 3.7 |
| | No. 2 Station | 93 | 22 | 4.2 |
| | No. 3 Station | 135 | 47 | 2.8 |
| | No. 4 Station | 60 | 16 | 3.7 |
| | No. 5 Station | 17 | 54 | 3.3 |
| | No. 6 Station | 101 | 29 | 3.4 |
| | No. 7 Station | 34 | 15 | 2.2 |
| | No. 8 Station | 67 | 24 | 3.7 |
| | No. 9 Station | 22 | .. | ... |
| | Total | 919 | 269 | 3.4 average cars per man |

Very complete records of all work done at the main shops and at the carhouse are made and kept on file available at any time for ready reference. These records are used by the officials to make careful studies of equipment failures, and result in improvements to overcome these troubles. Further, from these records monthly reports are made to the management covering a general summary of trouble and work done on the equipment. The daily inspection sheets are each signed by the men doing this work and are used by the company's legal department as evidence in case of law suits. Some of the most important forms used in connection with the work are reproduced herewith. In addition to the above, tabulated blueprints are kept up to date showing important details of all passenger and service equipment, also car assignment sheets giving the most important details of all cars operating from the various carhouses.

THE BELT RAIL IS BEING LEFT OFF THE CAR SIDE

The following system of inspection and general overhauling of equipment has been adopted and is being carried out on this property:

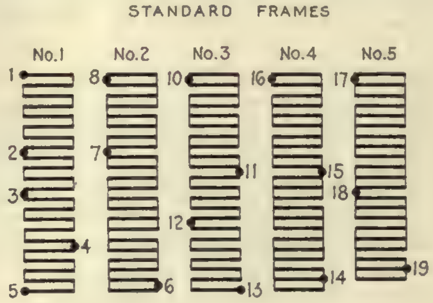
Daily inspection of cars with old style motors and brake rigging.

Light inspection every week.

Heavy overhaul every one and one-half to two years.

The daily and weekly inspections are made by the regular inspection force at the various carhouses, while for the general overhauling the cars are put into the main shops and the trucks and all equipment taken off and thoroughly overhauled. During this time the car bodies are very thoroughly cleaned and varnished or repainted.

The present working schedule of the shop for the general overhauling is from eight to ten cars each



| RESISTANCE AND CURRENT CARRYING VALUES OF EACH OF ABOVE STEPS | | |
|---|---|---|
| STEPS | OHMS | AMPERES |
| 1 to 2 | 1.28 | 30.4 |
| 2 to 3 | 0.64 | 30.4 |
| 3 to 4 | 0.80 | 30.4 |
| 4 to 5 | 0.80 | 30.4 |
| 6 to 7 | 0.56 | 60.8 |
| 7 to 8 | 0.32 | 60.8 |
| 10 to 11 | 0.40 | 60.8 |
| 11 to 12 | 0.80 | 30.4 |
| 12 to 13 | 1.12 | 30.4 |
| 14 to 15 | 0.214 | 91.2 |
| 15 to 16 | 0.400 | 60.8 |
| 17 to 18 | 0.214 | 91.2 |
| 18 to 19 | 0.160 | 91.2 |

COMBINATION STANDARD LAYOUTS

Based upon, weight of car, type of control, No. of motors, type and hp. of motor, gear ratio, size of wheel

| CLASS | STANDARD FRAMES | STEPS | TOTAL OHMS |
|---|---|---|---|
| A | 1-1 | 4 | 5.76 |
| B | 1-2 | 4 | 4.40 |
| C | 3-4-5 | 6 | 2.18 |
| D | 3-4-4 | 6 | 3.14 |
| E | 2-2-2 | 4 | 2.64 |
| F | 4-4-4 | 5 | 1.838 |
| G | 2-5-4-5-5 | 7 | 2.610 |
| H | 3-2-5 | 6 | 3.574 |
| | | | |
| | | | |

STANDARD FRAMES OF GRID RESISTORS USING SINGLE THREE-POINT TYPE GRID week. This will vary depending upon the amount and importance of repair and upon the new work going through the shop.

### SHOP REARRANGEMENT TO FACILITATE MAINTENANCE

Within the past few years as the result of an investigation instituted by some of the officials of this company a number of important changes were made in the layout of the main shops and in the distribution of the work whereby the handling of the general overhauling of the equipment was greatly facilitated. In general the changes made were as follows: (1) The electrical department was moved into the main shops near the motor and truck floor; (2) the work in the motor, truck and carpenter shops was rearranged to permit the carpenters and electricians to work on the cars at the same time; (3) carhouses were provided with necessary tool equipment to do their light repair work, thus relieving the shop.

All carhouses are clean and comfortable with well-lighted and orderly arranged pits, in which are to be found the required wrenches and small tools necessary to handle all repair and inspection work on the equipment. These pits are also equipped with the necessary small machine tools and hoists to take care of all light repairs at a saving of time and money. The material used is handled on an exchange basis. Each house is assigned a definite amount of material, and to make a replacement at the main shops the old parts must be turned in and exchanged.

THIS TYPE OF HEADLIGHT HAS BEEN RECESSED INTO THE DASH

Each carhouse is in charge of a general foreman, who reports directly to the superintendent. In general, the force, which will vary with the number of cars parked in the carhouse, consists of a general foreman, an assistant foreman in charge of inspection, a light foreman, a general utility man, a controller inspector with helpers, an air inspector and helpers, a brake inspector and helpers, a motor inspector and helpers, an oiler, helpers and cleaners.

Some of the work done at the carhouses consists of daily inspection of cars with old style motors and brake rigging; weekly inspection of cars; sweeping of cars every night; washing outside of cars every four or five days; washing inside of cars every four weeks; changing wheels on cars, changing armatures and doing light repair work on crippled cars; submitting daily reports on all crippled and O.K. cars and reports on all cars inspected.

All carhouse foremen are furnished with a summary of the weekly records of crippled cars from all houses. This scheme has created a friendly competition among the various foremen which tends to bring out the very best efforts of the men to make a creditable showing for their respective houses.

To meet the severe operating conditions during the winter season ample equipment, consisting of sweepers, plows and other apparatus, is available, and a definite snowfighting program has been worked out and is put into effect.

The reclamation department, which was recently organized, has made an excellent showing during its short existence. The welding room is the most promising division of this department as it has made possible the salvaging from the scrap pile of a large number of motor and truck parts. This work is being done at a large saving and has greatly facilitated the overhauling work on equipment. Some of the results obtained in this department are shown by the figures taken from the records in the accompanying table.

An illustration on page 281 shows a pile of damaged and discarded gear cases in the background, while in the foreground are shown four similar cases that were reclaimed. Repairs are made by either the oxy-acetylene, electric or thermit process of welding, depending upon the size of the piece to be repaired and the final finish to be given the welded section. In doing this work much depends upon the skill of the operator, the welding metal and the flux used. A skilled workman by using the right combination of welding metal and flux can produce either a very hard or a comparatively soft welded joint.

RECESSING THE HEADLIGHT INTO THE DASH ELIMINATES TROUBLE

Another illustration shows the babbitting department, which is fitted with two gas-heated pots, one used in burning off the grease and melting the babbitt from the old shells and the other to heat the clean metal used to reline the bearing shells. A high grade babbitt metal is used and great care is taken with each operation to produce reliable bearings. In order to make a good tinning job on the car journal brasses, a buffing wheel has been installed on which the surface to be tinned is thoroughly cleaned and polished. A further improvement considered for this department is the installation of an automatic temperature controlling device for the babbitting pots to maintain the correct working temperature of the metal.

| Repaired Parts | Jan. | Feb. | March | April | May | June | July |
|---|---|---|---|---|---|---|---|
| Gear case halves | 46 | 63 | 45 | 60 | 94 | 92 | 76 |
| Motor frames | 8 | 11 | 9 | 12 | 5 | 13 | 15 |
| Trucks | .. | .. | 20 | 12 | 19 | 20 | 14 |

With the great variety of equipments on this property, it was found that originally sixty-two different types of grid resistors were used. This required a large stock of individual castings and a great variety of assembled frames in order to make the necessary repairs

DAMAGED GEAR CASES AND SAMPLE RECLAIMED BY WELDING

when needed. This question was given careful thought and study, which finally resulted in adopting as a standard a single three-point type grid resistor which is now being applied to all equipments to replace the original sixty-two varieties. This single grid is built up into five standard frames which can be arranged in eight groups or classes suitable for all of the equipments. This arrangement when finally installed will be a big factor in facilitating repairs on the grid resistors.

### METHODS OF WINDING, DIPPING AND BAKING

The winding department within the past few years was brought into the main shop nearer the motor and truck floor and this change has saved considerable time and money. In connection with the regular routine work in this department there are in use several schemes which are worth special mention.

Armature coils are heated in an electric oven, thus softening the insulation, making the coils more pliable and less likely to have insulation damaged while winding.

A complete outfit is in operation for impregnating field coils with insulating compound.

A dipping and baking plant has been installed to treat armature coils and completely wound armatures.

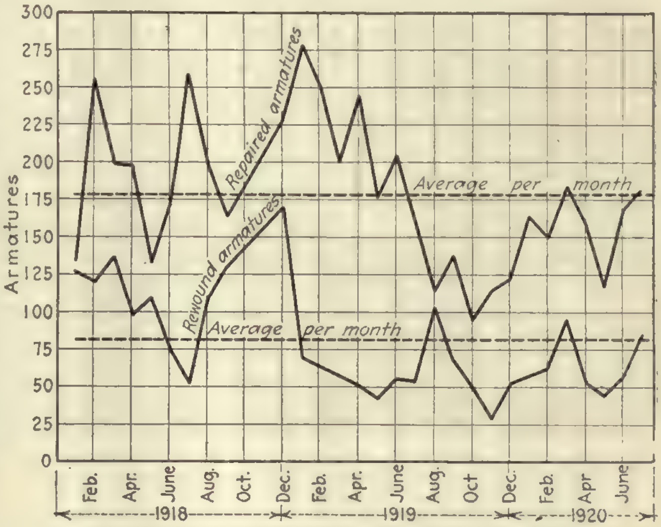
Armatures are inclosed in a flexible wood crate while being transferred between shop and carhouses. This carrier is readily applied and provides ample protection for the commutator and windings.

BABBITTING DEPARTMENT

The commutators on all machines have the mica undercut approximately $\frac{3}{64}$ in. All repaired armature windings are given an insulation test of 1,200 volts and new windings 2,000 volts to ground. This company has a definite program laid out covering the dipping and baking of all repaired and rewound armatures. This was put into effect more than a year ago and to date results have been very gratifying. In addition to the above all new field coils are impregnated.

The baking oven has natural ventilation, is heated by electricity and has automatic control to regulate the temperature. Schenectady black varnish is used and armatures are first heated about twelve hours, then dipped pinion end down except a few types of smaller sized motors, which are dipped commutator end down. Armatures remain in varnish until all bubbling ceases and then are baked for forty-eight hours at a temperature of 225 deg. F. The results obtained from treating armatures in this manner have been so satisfactory that this company is planning to put in additional equipment to dip and bake their completely wound motor frames.

An analysis of the pull-in reports showed an unusual number of broken motor cable leads especially on a certain class of cars. As a result of this investigation these cars during the overhauling period are having the car wiring put in conduits and motor cable leads securely cleated. All parts of the cleats are made a standard size and the motor leads are all brought out in the same relative position so as to make all parts on the trucks and car body interchangeable. All cables on the trucks are provided with two sets of quick break connectors so that the leads to individual motors as well as both sets of motor leads can be readily disconnected from the car body. When this work is completed it promises a further reduction of car pull-ins from motor lead troubles.



CURVES SHOWING ARMATURES REPAIRED AND REWOUND

One detail in connection with the reconstruction work on trucks which has been given considerable attention by this company is that of providing hardened steel bushings at all wearing parts of the truck frames. This construction provides not only a longer life but also an easy means of repairing parts when they become badly worn.

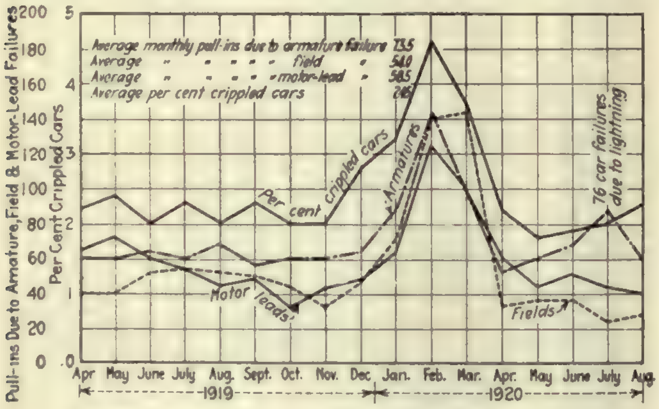
As a result of experience several changes have been made on standard car equipment which show what can be accomplished in the way of reduced maintenance by carefully going after mere details.

The belt rail is left off the sides of cars. This rail consisted of a wood strip running the entire length of the car on both sides about half way between the under side of the windows and the bottom of car body. This strip tended to catch water which would rust the side plates of the car body at this point, resulting in frequent repairs.

The fuse box on the same cars was located under the car at the side near the door and was either continually grounding due to drip water or being knocked off by passing automobiles. They are being removed and placed under the car just ahead of the main air reservoir.

By a comparison of the headlights shown in cars in accompanying illustrations it will be noted that one extends out very much farther than the other. The headlights extending out so far have been a source of continual trouble by being damaged and torn off by the trolley rope on the car ahead when operating in congested districts. All of these types of headlights are being reconstructed in the reclamation department and remounted as shown. This has eliminated much trouble.

On all single-end cars the apron on the front dash is left off as a matter of economy. This apron was originally placed over the dash at front and rear to keep small boys from finding a good foothold to ride on rear of cars and this protection is necessary and still maintained on double-end operated cars. However, on cars operated in one direction, this protection is not needed at both ends of the cars so the apron is left off at the front end, thus reducing maintenance costs.



CURVES SHOWING CRIPPLED CARS AND PULL-INS

At the main shop all assembled motors are given a no-load running test to check the bearings. Similar tests are made at the carhouses on all box frame motors when armatures are changed. The question of giving all repaired motors a running load test at the shop to weed out defective workmanship and material is now being considered by this company. When armatures or motors are changed on any cars at the shop or carhouses, each individual motor on the car is checked for correct connections by spinning the wheels. This is done in both directions to insure all motors working together. The car before being put in regular service is always given a trial run on a section of the main track to try and locate any possible trouble with the bearings or electrical equipment.

### SOME LOW MAINTENANCE COSTS

WELDING ROOM

In addition to trying to improve the maintenance methods this company gives very careful attention to operating costs on details as the management is a firm believer in looking after the small things on the property. The following cost figures show what has been accomplished along this line:

| | |
|---|---|
| Carbon brushes per thousand car-miles | $0.09 |
| Lubrication per thousand car-miles | 0.219 |
| Trolley wheels per thousand car-miles | 0.29 |
| Lamps per thousand car-miles | 0.75 |
| Brake shoes per thousand car-miles | 0.90 |

The curves shown were plotted from values taken from the weekly report of pull-ins and in general they show that the peaks during the winter months are due to severe snow conditions. The armature curve was given an upward turn due to lightning trouble during the summer months and the general trend of motor lead and field troubles is downward. The percentages of crippled cars averages 2.4 per cent, which is a comparatively low figure.

The general tendency of both the repaired and rewound armature curves is downward, with an upward turn in the winter on account of snow conditions and again in summer due to severe electrical storms.

The high peak on all the curves occurred during February, 1920, and it will be recalled that this was a particularly severe period in regard to weather conditions. The peak in the armature curve for July, 1920, includes seventy-six failures which occurred as a result of a severe electrical storm.

MOTOR CABLE LEADS ARE SECURELY CLEATED IN POSITION

# Des Moines Rides Buses and Walks

### Public Calamity Being Enacted with Meager Public Concern — Dilapidated and Crude Buses Trying to Replace Street Cars, While Many Walk or Stay Home—No Great Effort Toward Solution Being Made

BY "OBSERVER"

DES MOINES, the capital city of Iowa, with a population of 126,000, has harassed its street railway company until it has been forced to cease operation, thereby imposing on the citizens what is little short of a public calamity, though but partially realized as yet at the end of the first week, when this is written. Every effort was made by the company to effect a settlement of the difficulties and warning was given of the necessity to shut down unless some solution were promptly found. The city authorities, the newspapers, and the people generally, seemed to believe this was only a bluff and refused to take the matter seriously. The shut-down followed at midnight on Aug. 3, at the order of Federal Judge Martin J. Wade, under whose direction the property had been operated under receivership since January, 1921. Operation of the lines having ceased, the bondholders have started foreclosure proceedings.

Now Des Moines is a free-for-all bus town, licenses being issued to all comers regardless of the type or condition of vehicle and with the simple requirement of a $25 license fee and a $5,000 indemnity bond. The $25,000 state bond for vehicles carrying over fifteen passengers is apparently not being enforced. At the end of the first week approximately sixty buses of all kinds and sizes brought in from Kansas City and St. Joe, Mo.; Hutchison, Kan.; Sioux City, Ia.; Minneapolis, Minn., etc., were doing their utmost in an unorganized and inexperienced way to make these few do the work that normally requires more than a hundred double-truck street cars. The results are pitiable indeed, yet the public officials seem to be complacently viewing the spectacle, while the people who must ride suffer a congestion and actual danger seldom witnessed. Even the downtown merchants, whom one would expect to be greatly concerned, are only passively interested as yet. They have been working in a way to set up a plan acceptable to company and city, but they have not displayed the determination one would expect of them to bring about a prompt settlement and return of the cars. Of a number of merchants interviewed, none was found who really felt keenly the absence of the cars, though a few seemed aware that a continuation would undoubtedly affect their business. Two complained that business had been so poor anyway that they guessed it could not be made any worse. Des Moines has been very hard hit in a business way because of its very large dependence on the farmers. The people riding the buses for the most part seem to be taking the situation somewhat as a "lark" and good naturedly making the most of the intolerable riding conditions. The private automobiles, of which Des Moines has a very large number (Iowa has one for every 6.7 inhabitants), come into the city loaded with friends and strangers in the morning. Practically all automobiles at this time of day are bound for the downtown business districts, though it is more difficult for the unfortunate pedestrian to intercept a ride going home in the evening, when the route of the private car cannot be foretold. However, many people wait thirty minutes and more for a lift in a private automobile. Others are walking six and seven blocks to board buses on their way to the downtown loop so that many of the buses are well loaded for the return trip when they arrive downtown. Great numbers of people are walking, and great numbers of women and non-necessity riders are staying at home rather than endure the discomforts, not to say embarrassments, of the Des Moines motor bus trip. The remark is frequently heard that a person is actually afraid to ride in the buses. This is not difficult to understand when one observes the crowding of thirty-five and forty people into buses seating twelve to eighteen. The low headroom, limited foot space and general *compression des voyageurs* makes a rush-hour ride one not to be readily forgotten. Passengers are so crowded in that in practically every bus they fill up the front end at the right of the driver so that he has no vision to the right at all. Indeed, in some buses passengers occupy the space at the front of the car on both sides of the driver so that he has no vision in either direction and can see only what is immediately in front of him. Therein lies the greatest danger, and it is only by the grace of God that a serious accident has not been recorded. Further danger lies in the fact that the buses in use were not designed for such extreme loads to begin with, and furthermore, most of them are in extremely poor condition.

Other evidences of the effect of the street car shutdown is afforded by action of an amusement park management and the State Fair Association. The management of the latter issued a statement to the effect that without street car transportation the Fair, which is scheduled to open Aug. 24, would produce a deficit of $150,000. Last year the Des Moines City Railway pro-

DAILY AVERAGE DATA OF 5-CENT BUS LINES IN DES MOINES

| Line | 1921 Days Covered by Check | Number of Buses | Number of Trips | Total Bus-Miles | Number of Passengers | Passengers per Bus per Day | Total Earnings | Earnings per Bus per Day | Earnings per Bus-Mile |
|---|---|---|---|---|---|---|---|---|---|
| Walker | 4-18 to 4-20 | 3 | 99 | 371.97 | 1,074 | 331 | $40.16 | $16.46 | 14.3c. |
| Walker | 5-16 to 5-18 | 5 | 165 | 620.79 | 1,735 | 347 | 86.73 | 17.35 | 13.9c. |
| University | 3-12 to 3-26 | 10 | 402 | 1,310.04 | 4,836 | 487 | 249.55 | 25.00 | 18.0c. |
| University | 4-25 to 4-30 | 10 | 362 | 1,176.63 | 4,123 | 412 | 206.15 | 20.62 | 16.5c. |
| Sixth Ave. | 2- 1 to 2- 2 | 5 | 219 | 742.36 | 2,600 | 532 | 133.00 | 26.00 | 17.7c. |
| Sixth Ave. | 3-28 to 4- 1 | 8 | 388 | 1,336.09 | 5,051 | 635 | 252.53 | 31.56 | 17.1c. |
| Sixth Ave. | 5- 9 to 5-14 | 8 | 357 | 1,228.65 | 4,327 | 624 | 249.50 | 30.77 | 20.2c. |
| Clark | 2-16 to 2-18 | 2 | 78 | 243.2 | 1,071 | 536 | 53.57 | 26.78 | 20.5c. |
| Clark | 4-11 to 4-16 | 5 | 162 | 500.6 | 2,096 | 465 | 104.80 | 23.26 | 20.5c. |
| Clark | 5- 2 to 5- 7 | 5 | 196 | 607.1 | 2,397 | 497 | 119.84 | 24.83 | 19.7c. |
| Valley Junction* | 4- 4 to 4- 9 | 4 | 104 | 601.76 | 1,664 | 459 | 124.81 | 34.61 | 20.9c. |
| Valley Junction* | 4-25 to 4-30 | 4 | 108 | 625.2 | 1,637 | 609 | 122.74 | 30.70 | 19.5c. |

* Charge 10-cent cash fare with reduced ticket rate, making average fare 7½ cents.

A Grocery Store on Wheels Converted into a More Profitable Forty-Seat Bus and Named by Patrons "Saint Vitas" Because of Its Riding Qualities

A Great Scheme for Fast Loading and Unloading but Requiring Two Men. The Steps Fold up When the Driver Pulls the Rope

vided sixty cars to serve the State Fair, giving a forty-second headway all day up to 7 p.m. and hauling as many as 75,000 people in one day. One evening after a show at the fair grounds two full round trips of the sixty cars were required to haul all the people home. The manager of Riverview Park has announced that he will close the park on Sunday, Aug. 14, because of the falling off in admissions. At least 80 per cent of the 25,000 a week who patronize this park are car riders. To attend the park now, unless they live directly on the line of buses which is trying to serve the park, patrons must pay one fare to get into a jammed bus to ride downtown and then fight to get into another and pay another fare to proceed to the park. Naturally they stay at home rather than suffer this experience.

### Extent of Bus Service

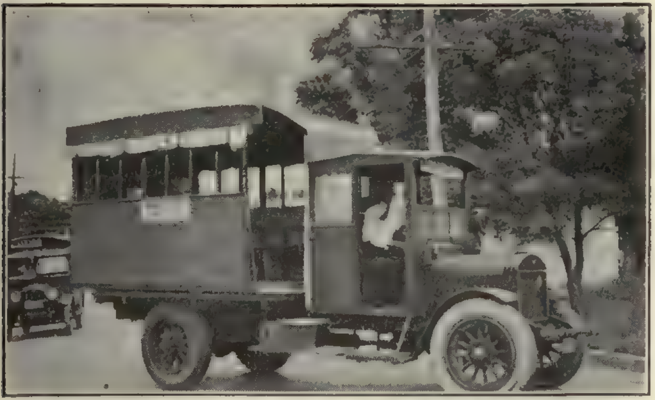
Prior to the shutting down of street railway service, on May 23 there were twenty-five buses operating in competition with the company, on July 6 there were thirty-six and between this time and the day operation ceased, Aug. 3, not more than two or three additional buses were added to the competitive service. A check made on Aug. 5, the second day after the shutdown, showed there were fifty buses; on Aug. 6, fifty-six, and on Aug. 7, fifty-six maximum, including all cars hauling passengers whether bus or jitney touring cars. These figures were obtained through an accurate check made by the railway company and are considerably less than the number of buses claimed by the bus men's association to be in operation. The association claimed to have eighty-six buses in operation for the rush hour on Aug. 10, one week after railway operation ceased, but judging from figures given out previously it was estimated that there possibly were sixty-five buses.

During March, April and May of this year five different lines of buses paralleling street-car lines were operated. Buses were also operated spasmodically on other lines, presumably as a trial of the possibilities. Now an effort is being made to give some bus service along thirteen of the fourteen main car lines. Four of these, however, were being operated with but one bus, giving an average interval on the four lines of thirty minutes. Some of these bus lines are turned back about 1 mile short of the end of the car line, where the railway has turned back its tripper cars. The buses charge a 5-cent fare without transfer, whereas the railway fare was 8 cents cash, two tickets for 15 cents, with universal transfer and 2½-cent tickets for high school pupils and for children under 12 years of age. In April, May and June over 18 per cent of the total passengers carried by the railway used transfers. This week the buses put into effect a six-for-a-quarter ticket good between 9 and 4 to stimulate shopping. The tickets are sold on the buses.

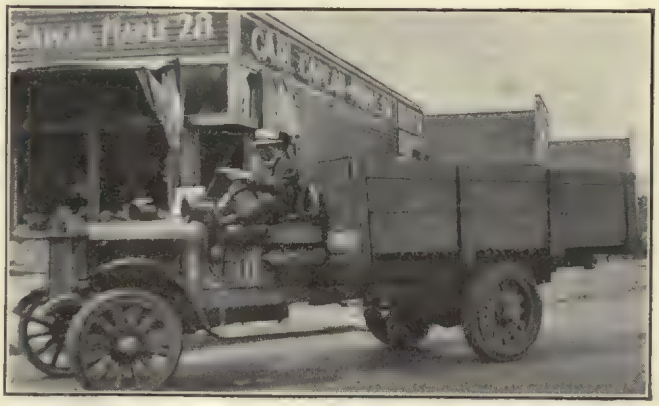
While the bus men have an association, comprising a majority of the individual owners, they are operating largely as individual enterprises and agreeing to a certain extent on schedule and other matters of service. Of course if a driver gets tired during the dull hours of the afternoon he drops out for one trip so that the interval is rather unreliable. A complete check made on Aug. 5 of the bus headway on each line between the hours of 7 and 10 a.m. and 2 and 7 p.m. disclosed a most erratic service, with intervals on the same line of from two minutes to forty-five minutes.

An Old Timer Brought Back Into Service

One of the Best Buses in Des Moines



A Field Real Estate Office Lifted on the Truck to Make a Bus Body. Affectionately Named the "Grainary"



The "Ice Wagon," for that Is What It Is in Des Moines Except that Seats (Board) Have Been Added

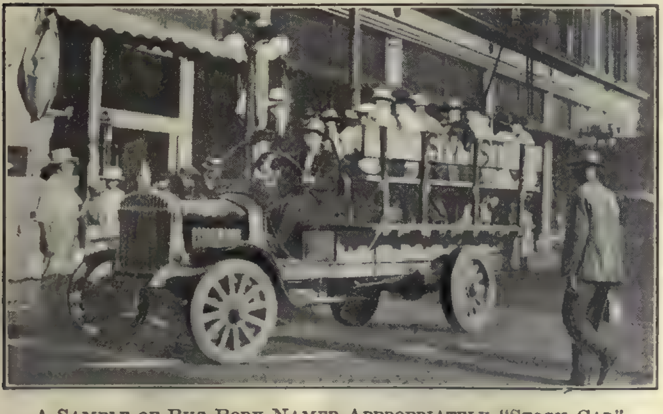
Of course, in fairness it should be said that the busmen cannot be expected to establish overnight a very complete or reliable service, or to equip themselves with first class buses. Through their association they have been endeavoring to secure a one-year franchise, upon receiving which they guarantee to spend a considerable sum of money for new buses, adequate to handle the city's traffic. Consequently, the buses that are now being supplied are such as could be purchased for comparatively small sums and financed on what little money the driver had available personally. The result is rather humorous, if one can forget the seriousness of the situation. The patrons have a good many of the buses named, as indicated in the captions under the accompanying pictures. They range in size from a seating capacity of eleven up to forty and employ old four-cylinder Cadillacs, GMC, Reo, White, Masters, Stewart, Republic and other chassis.

It is not thought that the number of buses in operation will be increased materially until the bus owners can be given some assurance by the City Council as to what their life will be. License fees for the buses now in operation expire on Sept. 1 and there is no desire upon the part of bus owners to pay the annual fee until some plan for future operation is worked out. It is said that ten buses from another city are waiting for shipment to Des Moines for the word that they will be given a lease on life by the Des Moines City Council.

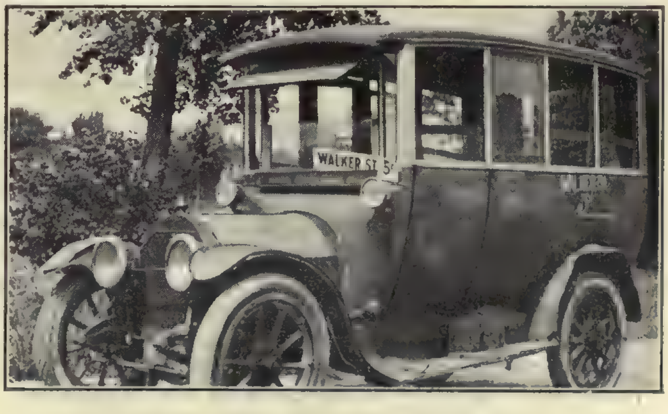
### BUS MEN WANT THE BUSINESS

In addition to the efforts of the local bus men's association to secure a franchise, several other interests have been actively at work endeavoring to secure a franchise or promote a company to finance a system of buses to displace the street railway system. Typical of these propositions is the following made by T. J. Fay, president Fay Motor Bus Company, which has made quite a success of a 10-cent motor bus line in Rockford, Ill., and has started a system in Little Rock, Ark., and in one or two other places.

> The Fay Motor Bus Company, co-operating with a number of substantial business men of Des Moines, hereby makes you a tentative offer to install and operate in the city of Des Moines a complete motor bus system, consisting of at least 154 buses of an average seating capacity of twenty passengers per bus.
>
> After closely observing the intracity traffic of the present motor buses and traction lines now operating here, and estimating the amount of passengers that offer themselves for transportation, we find that the number is about 105,000 passengers in each day's operation at the present time, and as conditions improve, we will furnish all of the additional equipment necessary to give adequate transportation for the city of Des Moines at a fare of 5 cents from all outlying districts to the center of population as described on the accompanying map submitted to you, and issuing a transfer from transfer points at an additional charge of 2 cents, enabling a passenger to go from any part of the city to any other part of the city at a total fare of 7 cents. While we are basing these lines at the present time on general transportation lines now established, we stand ready to alter or to add additional lines as the necessity arises.
>
> We also submit a survey of the operation, basing the costs of same on an experience acquired during the operation of over 7,000,000 miles.
>
> Believing that the city should be recompensed for the use of such streets as the buses would operate over, and estimating the probable cost of the additional wear and tear on the pavements and streets of such routes, we would agree to recompense the city for such operations at the rate of $25,000 for each year of such operation. We also agree to clear the snow during the winter over our established routes sufficient to allow buses to operate during all weather conditions, and also agree to maintain a sufficient reserve to cover any just claims for personal injury or property damage that may accrue in our operation.



A Sample of Bus Body Named Appropriately "Stock Car"



Another Relic Enjoying a New Life

Inasmuch as it is a very serious step for the city to enter into such a contract as we propose, and also a very large investment for those people interested in the installation of this system, we wish to have this considered a tentative proposition and would suggest that if you intend giving it your serious consideration, that we enter into the details, routes and other arrangements more definitely and perhaps work out a number of details in this problem to a more mutual conclusion, as we estimate the investment of this bus system to cost close to $750,000, including equipment necessary for the upkeep of such a large organization.

### COMPARISON WITH RAILWAY SERVICE

The downtown district of Des Moines lies just about at the center of the 50 sq.m. included within the city limits. For this reason the mileage on practically all of the lines is unusually uniform, all lines radiating from the central district with no through lines and no cross-town lines. The average length of all the lines is 4 miles, giving an average round-trip distance of 8 miles. This characteristic of the city transportation system results in fairly short haul. The easy topography of the city, the fact that 85 per cent of the streets of Des Moines are paved and that the peak load is well distributed both morning and evening, also rather favor the possibility of providing the necessary transportation with buses. However, the handling properly of the rush-hour crowd presents a problem in a city of this size on which there is much well founded doubt that buses could possibly be adequate to the requirements. While the city authorities have apparently preferred to have transportation revolution rather than evolution, they have evidently been wise enough not to sign up any contract with a bus concern to supply the city's entire transportation needs. Of course such a franchise would have to be passed upon by the voters before becoming effective.

SURVEY OF BUS AND TRANSPORTATION PROBLEM AT DES MOINES, IOWA, SUBMITTED BY T. J. FAY

| | | |
|---|---|---|
| Average daily number of passengers carried on buses and traction lines | | 105,000 |
| Number of buses necessary to carry 105,000 passengers per day at average of twenty-five passengers per round trip | 140 | |
| Additional equipment allowance of 10 per cent (replacing cars in repair shop) | 14 | |
| Total buses necessary | | 154 |
| Note: (Due to the fact that there are portions of the day when the full equipment is not necessary, buses can be overhauled and repaired during this portion of the day, and the average operating efficiency should easily be at least 95 per cent.) | | |
| Number of bus routes operating from center of city necessary to cover entire city | | 13 |
| Average distance of each round trip | | 6 miles |
| Receipts per trip of twenty-passenger bus with average round trip load of twenty-five passengers | | $1.25 |
| Average revenue per bus-mile | | 20½c. |
| Number of trips per day necessary to carry 105,000 passengers at average of 25 passengers per round trip | | 4,200 |
| Number of trips per bus per day | | 30 |
| Average number of miles operated per day | | 25,200 |
| Average number of miles per bus per day | | 180 |
| Gross receipts per day carrying 105,000 passengers | | $5,250 |
| Transfers to be issued at additional price of 2 cents each, making cost of riding from one extreme limit of the city to the opposite city limit | | 7 cents |
| Ordinary fare from any part of city to center of city | | 5 cents |
| Estimating twenty-five passengers for each round trip, whereas seating capacity per round trip is forty (with additional 50 per cent standing room, or possible round trip capacity of sixty), it is possible with this equipment to carry an additional 25 per cent or a total of 130,000 passengers per day. This increase is allowed for periods of the day when there might be an unusual rush | | |

SURVEY OF COSTS PER DAY FOR OPERATION OF 154 BUSES

| | | |
|---|---|---|
| Overhead (operating) | $856.80 | |
| Depreciation (40 per cent a year) | 767.12 | |
| Insurance reserve (casualty) | 154.00 | |
| Total overhead | | $1,777.92 |
| 7 per cent interest return on $700,000 investment: | | 134.25 |
| Maintenance: | | |
| Gasoline | $587.16 | |
| Oil | 52.84 | |
| Tires | 690.00 | |
| Shop repairs (labor) | 65.52 | |
| Parts, etc. | 166.32 | |
| Total maintenance | | $1,561.84 |
| Drivers' salaries | | 1,081.99 |
| Total daily cost of operation | | $4,556.00 |
| RECAPITULATION | | |
| Gross receipts (105,000 passengers at 5 cents) | | $5,250.00 |
| Total operating cost per day: (154 buses making 4,200 trips per day at 6 miles per round trip or 25,000 miles at 18 cents per mile) | | $4,556.00 |
| Net profit per day | | $714.00 |

The normal base schedule of the Des Moines City Railway calls for seventy-nine cars, with fifty-three additional tripper cars during the rush hour. These 132 cars are so scheduled that 190 cars leave the downtown loop during the maximum hour. During this rush hour, on a certain day when the street cars and thirty-six buses were both operating, a total of 10,815 passengers were handled out of the loop. On the assumption that all of the passengers carried by both agencies had been carried on the street cars, the total square feet per passenger of street-car floor space provided was 4.2, each street car having 281 sq.ft. or a total for the 190 cars of 53,390. Assuming an average floor area of 74 sq.ft. for the buses in order to give an equivalent floor space of 4.2 sq.ft. per passenger with buses, it would have required 721 buses during the hour scheduled through the loop to handle the complete traffic of 10,815 passengers. This would mean that an equipment of 480 buses would be required, assuming a schedule speed and length of haul equal to that of the railway. When 132 street cars were provided to handle this load, they were not crowded, so that the comparison as indicating actual requirements that must be faced by the buses may be overdrawn. But even dividing the estimate by two, the result, 240 buses, would be a very long way from the estimate of 154 buses as made by Mr. Fay. The following additional data will be of interest in comparing the railway operation with the proposal of the bus men.

The average schedule speed of the railways including layovers, etc., was 9.5 m.p.h. In April of this year the operating expenses, including 8 per cent depreciation, were 34.62 cents per car-mile, and the passenger revenue, 35.01 cents. In June, because of greatly curtailed mileage on account of the partial shutdown of the power system, the operating expenses, including depreciation, were 42.21 cents per car-mile, and the passenger revenue, 47.09 cents. The revenue passengers per car-mile in January of this year were 5.60, in February 5.57, in March 5.05, in April 4.63, in May 4.91, and in June 6.16. These figures indicate very clearly the effect of the increasing jitney competition which began in January and the 60 per cent curtailment of car mileage which took place on May 23, due to power shutdown. For the first six months of the current year the revenue passengers per car-mile were 5.28 and the total passengers per car-mile 6.31.

A good idea of the earnings of the buses in Des Moines under competitive conditions; in other words, while the cars were running, may be had from the accompanying tables of data gathered from checks made on the days indicated this year.

The proposition of the bus company given heretofore might be compared with the statement of the engineers of another well known and competent truck manufacturer who appeared before the City Council and Chamber of Commerce and made the statement that if up-to-date bus service was provided with buses costing $8,500, the daily cost of operation for labor, maintenance and depreciation would be $41, and that on a 5-cent fare it would be necessary to haul forty persons each round trip for eighteen hours a day to earn this sum.

Several of the bus-owner drivers were talked to, and they seem to think they are making money now and plenty of it on a 5-cent fare, and will continue to do so even with the six-for-a-quarter ticket rate. They seem eager for the opportunity to demonstrate to the people of Des Moines that they can provide adequate service. Their most common remark is: "You give us a franchise and we will give you the service." Strange to say, they are asking only a one-year franchise, and on the strength of this declare themselves willing to purchase fine new buses and discard the present makeshift contraptions. Also, on the strength of such a franchise, they declare they had been assured of financing by one of the large manufacturers of trucks and farm implements. A franchise cannot be granted, however, without a vote of the people, which will require considerable time and there is much doubt that it would pass.

### CAUSES OF THE PRESENT SITUATION

The franchise under which the Des Moines City Railway has recently been operating is a twenty-five-year grant passed by the City Council Oct. 2, 1915, and approved by the voters on Nov. 22, 1915. The original franchise given to this company was dated Jan. 1, 1868, with a term of thirty years. From the date of this expiration in 1898 until the new franchise was started in 1915 the company was almost continually in the courts over a controversy as to whether the old franchise was actually limited to a period of thirty years or was in perpetuity. The supreme court of Iowa finally held that the franchise did expire on Jan. 1, 1898, and gave the company two years in which to secure a franchise or remove its tracks from the streets, but this legal battle and a belligerent attitude toward the people on the part of the old managements did much to develop an antipathy toward the company. It formed a good groundwork for the succeeding agitation of three of the four local newspapers and the politicians.

The new franchise entered into as late as 1915 rather surprisingly provides that:

> The maximum rate of fare for a single continuous ride within the limits of the city in one direction over any route of the company during the life of this franchise shall be 5 cents in cash. The company, in at least twenty-five convenient places within the city, shall sell to any person applying therefor six tickets for 25 cents. . . . The fare for children under twelve years of age shall be 2½ cents. On the payment of a 5-cent cash fare, the conductor will give the child a ticket which will be accepted as fare for another ride if presented by a child under twelve years of age. High school pupils on their way to and from school on actual school days between the hours of 7:30 a. m., and 4.30 p.m., shall be carried on tickets . . . sold in books at the rate of twenty for 50 cents. . . .

The franchise also provides that universal free transfer shall be issued, and a transfer upon a transfer. The company agreed to expend $1,500,000 for reconstruction, rehabilitation, new lines and extension, according to a specified itemization contained in the franchise, within a period of three years. In connection with the service to be rendered, the following clause quoted from the franchise is enlightening in analyzing the company's financial situation:

> As a guarantee of the service provided for in this section, it is agreed that no dividends on the outstanding stock of the company shall be considered or allowed in determining the quality, quantity or kind of service the company is bound and obligated to furnish under this ordinance; it being understood and agreed that subject to the payment of all costs of operation, including taxes and interest at not to exceed 5 per cent on the company's indebtedness represented by bonds, and not to exceed 6 per cent of the remainder of such indebtedness, and the setting aside of a depreciation fund as provided in Sec. 22 of this ordinance, the city is entitled to have and the company is bound to render the first class service as defined in this section.

The provision with regard to depreciation is that after the expiration of the first three years, the

> Company shall set aside and charge off a sufficient depreciation fund to cover replacement, renewals, new equipment and installations necessary to maintain the entire system and preserve the property of the company . . . in modern first class condition suitable for the carrying on of the business of the company.

There is a provision whereby the company agrees to arbitrate any difference which may arise between the company and the city or between the company and its employees. Another significant statement is that "the company, by the acceptance of this ordinance, agrees to continue to contract with its employees . . ."

The sale of stock and bonds is under the supervision of the city and "discounts upon bonds sold by the company shall not be added to the value of the property for any purpose." The company agreed to the purchase of the street railway property by the city upon six months' notice at any time during the life of the franchise. For this purpose it was agreed that the value of the property as of Aug. 1, 1915, was $5,000,000.

These few extracts from the franchise will be illuminating in reviewing the development during the last few years.

A common remark heard among business men and on the street in Des Moines is that the company has not lived up to its promises. This is possibly true as to work done, but not as to money expended. In fact the company has jeopardized its financial strength in attempting to carry out its promises. Instead of expending $1,500,000 in the first three years of the franchise for rehabilitation, extensions, etc., as agreed to in the franchise, the company actually expended $2,427,000, though failing, on account of the great increase in cost of equipment and materials, to carry out the full program of extensions and new lines by an amount which would now cost approximately $400,000 to complete. The company has also been unable to keep up with the paving requirements imposed upon it by the city by a considerable amount, though it has expended from $50,000 to $60,000 a year in paving maintenance alone. Then, as to the rate of fare, the company has also not lived up to its contract, but had it not been aided by the courts, the people of Des Moines would probably have been without transportation several months earlier.

DATA FOR SIX MONTHS ENDED JUNE 30, 1921, DES MOINES CITY RAILWAY

| | Total | Per Car-Mile |
|---|---|---|
| Total passengers | 17,561,809 | 6.31 |
| Revenue passengers | 14,649,652 | 5.28 |
| Car-miles | 2,781,734 | 1.00 |
| Passenger revenue | 1,110.267 | 39.91 cents |
| Operating expense, including depreciation | 1,057.382 | 38.01 cents |
| Taxes | 84,000 | 3.02 cents |
| Fixed charges | 197,781 | 7.11 cents |

REVENUE PASSENGERS PER DAY, DES MOINES CITY RAILWAY

| Under Normal Service | | Under Reduced Service | |
|---|---|---|---|
| Sun., May 8, 1921 | 62,646 | Sun., July 24, 1921 | 50.390 |
| Mon., May 9, 1921 | 74,962 | Mon., July 25, 1921 | 54,565 |
| Tues., May 10, 1921 | 79,248 | Tues., July 26, 1921 | 55,683 |
| Wed., May 11, 1921 | 77,975 | Wed., July 27, 1921 | 52,857 |
| Thurs., May 12, 1921 | 79.503 | Thurs., July 28, 1921 | 50,689 |
| Fri., May 13, 1921 | 74,526 | Fri., July 29, 1921 | 54,779 |
| Sat., May 14, 1921 | 92.595 | Sat., July 30, 1921 | 55,884 |
| | 77,351 | | 53,550 |

The matter of wages has been very closely associated all along with the efforts made to secure an increase in fare, and aggravated by a very difficult labor situation. The present trouble first started when the company asked for an increase in fare to make possible the payment of increased wages awarded in arbitration. This went to a vote of the people in September, 1919, when a 6-cent fare was voted down. In January, 1920, the company went into receivership. A further wage arbitration awarded 70 cents an hour to the men, and as the company was unable to pay, the men struck. On the strength of a decision by the Iowa Supreme Court that a city had no right to fix the rate of fare, and in order to get the cars started, Federal Judge Wade ordered a 6-cent fare for adults to be put into effect on Aug. 23, 1920, the reduced rate for children and high-school students continuing as specified in the franchise. The additional revenue was to be applied to the payment of wages.

Finding itself unable to proceed longer on the 6-cent fare, the company applied to Judge Wade for a cut in service. A new schedule was drawn up and approved by the city supervisor and the date set to put it in effect. Corporation Counsel Byer then got an injunction against these schedules in the district courts. While there was some doubt as to the jurisdiction of this court, the company obeyed the injunction but again appealed to the Federal Court. The latter dissolved the injunction and ordered the district court to keep hands off. The reduced schedule was put into effect and the company ran along on this for several months until it became necessary to make a further cut in order to keep expenses within revenue. In December, 1920, Judge Wade appointed a master to make an investigation and recommend what would be a reasonable fare in order to put the company on its feet. After investigation the master recommended an 8-cent fare and an increase in the service by 1,800 car-hours per day. The company revised the schedule on that basis and on Dec. 23, at the order of Judge Wade, began the operation of 132 cars and the collection of an 8-cent fare with two tickets for 15 cents.

Then in January, 1921, having been defeated in its efforts to retain the 5-cent fare, the City Council opened the doors to jitney and bus competition, with the results related early in this article. The schedule of 132 cars remained in effect until May 23 of this year, when the court approved the petition of the General Electric Company to remove all equipment from three 500-kw. automatic substations and one 5,000-kw. generator, switching equipment, etc., from the power house, for which the manufacturer had not received payment. This made it necessary on that date to cut the service to sixty cars, which of course greatly aggravated the local transportation situation and served as a strong inducement for additional buses to start in business. The company continued operation on this basis, losing money rapidly, until midnight on Aug. 3, at which time all operation ceased as ordered by Judge Wade upon petition of the company. All through the difficulties numerous attempts were made and various plans proposed to bring about a settlement, but to no avail. Consequently, approximately 750 traction employees were thrown out of jobs, about 250 additional having been laid off when service was cut to sixty cars, and the city is without transportation save what can be supplied by an unorganized group of sixty or seventy heterogeneous buses. The railway company has discharged all employees, including trainmen, linemen, shopmen, barn forces, and sixteen out of thirty-four power house employees. The power plant has been continued in operation to supply energy for the Inter-Urban Railway and four small towns and mines and various other industries along the interurban right-of-way. The load on the power plant is now 17,000 kw. as against a normal load of 50,000-kw. Only the main department heads throughout the company have been retained on the payroll. In other words, the company is completely shut down, and some $8,000,000 worth of railway property is standing idle.

# Economies from Use of Ball Bearings*

### Mechanical Troubles Have Discouraged Electric Railway Men From the Use of Ball Bearings, but a Satisfactory Type Will Effect Large Savings

By J. T. PORTER

Master Mechanic Northern Texas Traction Company,

THE results from the use of ball bearings for the journal bearings of electric cars has been somewhat discouraging to the mechanical department of electric railway companies. Numerous mechanical troubles have developed, caused by poor workmanship, and the time and labor necessary for making wheel changes have been much greater than is necessary when friction type of journals is used. This latter condition is due somewhat to the truck design which is now employed.

COMPARATIVE COSTS OF OPERATION OF BIRNEY CARS EQUIPPED WITH BALL-BEARING AND FRICTION-BEARING JOURNALS, NORTHERN TEXAS TRACTION COMPANY, YEAR 1920

| | |
|---|---|
| Cost to produce and deliver power to cars, per kilowatt-hour | $0.02 |
| Using the test made at Beaumont as a basis of power consumed by both types of bearings, we arrive at the following conclusions: | |
| Cost per car-mile for power, ball-bearing journals | $0.0228 |
| Cost per car-mile for power, friction-bearing journals | $0.0262 |
| Mileage for Birney cars, year 1920 | 1,967,005 |
| Cost of power used on Birney cars with ball-bearing journals | $44,847.714 |
| Cost of power used on Birney cars if same were equipped with friction-bearing journals | $51,535.531 |
| Actual saving in power during the year | $6,687.813 |
| Saving per 1,000 car-miles | $3.40 |
| Cost to remove, change bearings, change wheels and replace in car, inclusive | $8.71 |
| Cost to replace worn or defective journal ball bearings, year 1920 | $1,678 13 |
| Cost per 1,000 car-miles to make changes of the seventy pairs of wheels changed in 1920, plus the cost to replace worn or defective bearings | $0.917 |
| Saving per 1,000 car-miles, cost of wheel changes and bearing replacements deducted | $2 236 |

BALL BEARINGS VS. FRICTION BEARINGS FOR BIRNEY SAFETY CARS, BEAUMONT TEST

| | |
|---|---|
| **Power Consumption** | |
| Friction bearings, kilowatt-hours per car-mile | 1.31 |
| Ball bearings, kilowatt-hours per car-mile | 1.14 |
| Difference, kilowatt-hours per car-mile | 0 17 or 14 9% |

On a basis of 144 miles per day the ball bearings will save $89.35 a year. Considering the difference in price between ball bearings and friction bearing No. 218, the ball bearings would pay for themselves in two and one-half years.

| | |
|---|---|
| **Acceleration** | |
| Ball bearing, miles per hour per second | 2.88 |
| Friction bearing, miles per hour per second | 2.58 |
| Difference, miles per hour per second | 0.30 or 11.62% |
| **Free Running Speed** | |
| Ball bearing (maximum), miles per hour | 25 2 |
| Friction bearing (maximum), miles per hour | 23 8 |
| Difference, miles per hour | 1.4 or 5 8% |
| **Retardation from Maximum Speed** | |
| Friction bearing, miles per hour per second | 3.13 |
| Ball bearing, miles per hour per second | 1 90 |
| | 0 23 or 7 93% |

| | Ball Bearings | Friction Bearings |
|---|---|---|
| Stop, seconds | 8.20 | 7 43 |
| Distance, feet | 170.50 | 143 60 |
| **Retardation from 10 M.P.H.** | | |
| Stop, seconds | 4.9 | 3 75 |
| Stop, feet | 52.38 | 35 88 |
| Miles per hour per second | 1.72 | 2 28 |

It is possible to obtain about 2 per cent higher schedule speed with ball bearings

The accompanying tables show the results of some tests made at Beaumont, Tex., on cars equipped with ball and friction type bearings and will serve to show the economies that can reasonably be expected.

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*This is an abstract of the discussion presented by Mr. Porter at the interurban railway section of the Southwestern Electrical & Gas Association at its recent convention in Galveston.

# Equipment and Its Maintenance

*Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments*

## New Type Brake Slack Adjuster

**Type of Slack Adjuster in Service for Several Years on European Railways Introduced to Railways of This Country in Connection with Safety Car Operation**

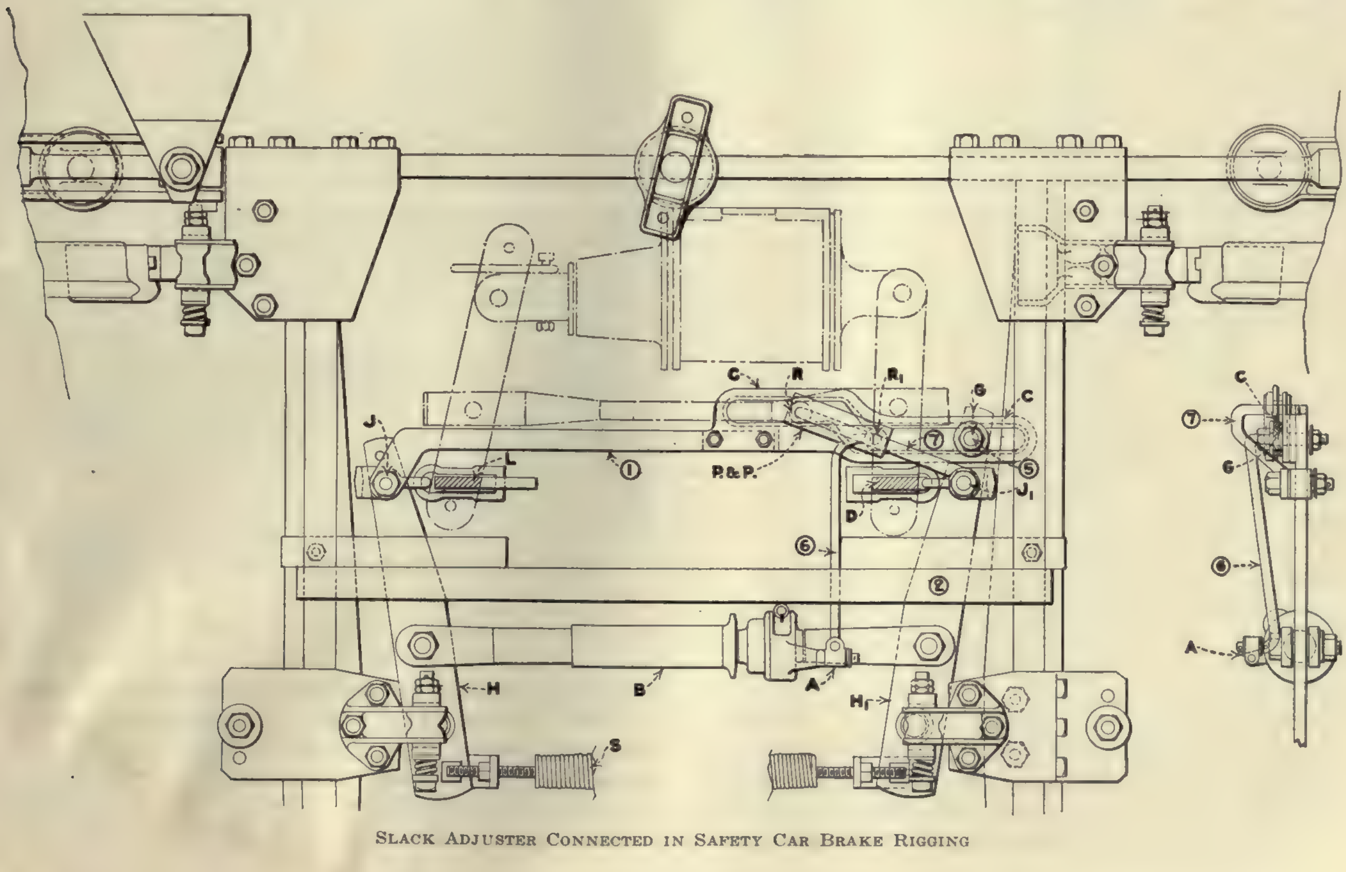
A TRIAL is being made on one of the safety cars of a large city electric railway system of a type of slack adjuster whose design and operation differ somewhat from others now in use in this country. This is known as the Durson slack adjuster and brake regulator. It has been used successfully on the railways of Sweden, Denmark, Holland and Switzerland, as well as on street railways of other European cities for several years.

The travel of the brake cylinder piston on cars equipped with air brakes may be considered as made up of three factors. First, the travel necessary to take up the shoe clearance and bring the brakeshoes into contact with the wheels if all adjustments are properly made; second, the travel necessary to take up any wear in the brake rigging or brakeshoes, and, third, the travel after the shoes are in contact with the wheels due to the elasticity of the brake lever system and the play in the journal boxes. The Durson slack adjuster differs in its operation from other types of slack adjusters now in use in that adjustment is automatically made for the second of these only; that is, the additional travel of the brake cylinder piston occasioned by wear in levers, fulcrum pins and brakeshoes, while no slack is automatically taken up for the travel necessary to take up the shoe clearance and to take care of the elasticity of the brake-lever system.

With the Durson brake regulator a certain predetermined minimum clearance between the brakeshoes and the wheels is fixed. Should there be any further slack due to wear of parts, wheels or shoes the adjuster comes into play and takes it up by the turning of a threaded shaft. When this point is reached the brake shoes touch the wheels at the same moment that the adjuster would otherwise begin to act and the friction moment in the screw thread due to tension in the brake rigging is then sufficient to overcome the frictional resistance in the adjuster clutch so that further working of the adjuster is stopped.

### INSTALLATION AND OPERATION OF THE SLACK ADJUSTER

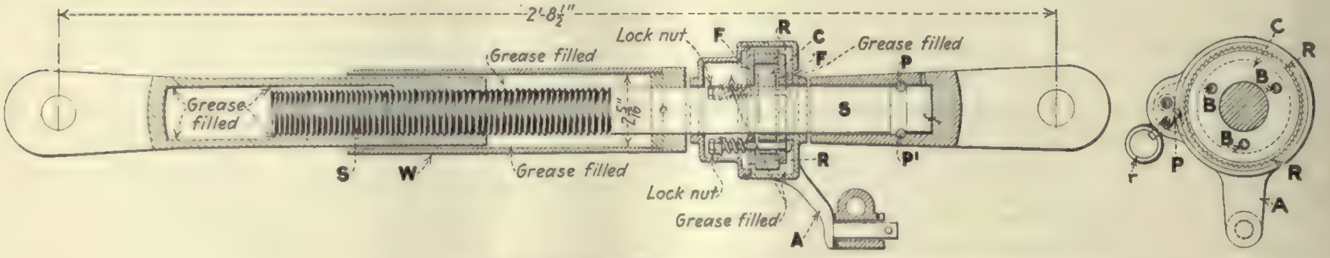
An accompanying illustration shows the Durson brake regulator connected in the brake rigging of a Birney safety car. The brake regulator *B* is placed between the horizontal brake levers *H* and *H*-1. Attached to these levers at *J* and *J*-1 is the bar 1, and to this is bolted



SLACK ADJUSTER CONNECTED IN SAFETY CAR BRAKE RIGGING the cam guide *C*, whose free end is held by means of a roller guide bolted to the horizontal lever *H*-1, which moves in the slot as the brake is applied and released. To the joint *J*-1 is attached the rod 7. The other end of this rod 7 passes through a roller *R* moving in the slot of the cam guide *C*. Two distance plates *P* and *P*-1, on either side of the cam guide *C*, transmit the motion to the roller *R*-1, which follows the motion of *R* and which in turn is connected by means of the rod 6 to the bracket arm *A* of the brake regulator. Upon the application of the brake, the rollers *R* and *R*-1 move along the slot of the cam guide *C* exactly as the distance between the joints *J* and *J*-1 is shortened. This motion is changed from longitudinal to transverse when the roller *R*-1 mounts the cam slot, and this operates the bracket arm *A* of the brake regulator.

In order to obtain the proper uniform clearances and, therefore, the proper piston travel, the distance that the roller *R*-1 moves before it starts to mount the cam is regulated to come at the moment when the brakeshoes come into contact with the wheels. This immediately starts movement in the bracket arm *A* of the brake regulator and takes up the slack if any exists.

The brake regulator itself consists of a cold-rolled steel shaft *S* to which two end jaws are connected. These jaws are in turn bolted to the horizontal brake levers and form a connecting rod in the lever system. The shaft is attached to one jaw by means of two pins, *P* and *P*-1, engaging a groove in the shaft. As the thrust is taken up at the face *f*, which is finished, the only function performed by the pins is to prevent the jaw from dropping from the shaft when the apparatus is removed. The other end of the shaft has a triple left-handed thread, which screws into the other jaw. A collar *C* is welded to the shaft. On either side of the collar are two friction plates *F*, which are free to turn about the shaft. Three bolts *B* are set in holes which are drilled through the friction plates *F* and the collar *C* by means of which the motion of the friction plates *F* is transmitted to the collar *C*. Between the two friction plates *F* and revolving freely on the collar *C* is a circular ratchet *R*. Three springs, held in place by lock nuts, are adjusted to bring a desired degree of friction between the friction plates *F* and the ratchet *R*. Motion therefore of the ratchet *R* is transmitted through the friction plates *F* and the collar *C* to the shaft *S* unless the friction moment of the shaft *S* is greater than that between the friction plates and the ratchet *R*. In this case the ratchet *R* slides between the friction plates without imparting its motion to the shaft.



SECTION OF SLACK ADJUSTER

The ratchet, friction plates, collar and springs are inclosed in a grease-filled housing. The bracket arm *A* is a part of this housing and transmits the motion from the cam slot as already described. The pawl *P* is also connected to the housing as shown and engages the circular ratchet *R* when the bracket arm *A* is moved in a clockwise direction.

In operation, when the rod connecting the roller *R*-1 in the cam slot is moved in a transverse direction away from the regulator, it moves the bracket *A* in a clockwise direction. As noted, this motion is transmitted to the shaft and the revolution of the shaft in the female end of the hollow end jaw, which has a triple left-hand thread, causes the distance between the two jaws to be increased. This will take up any slack which may be present until the brakeshoes make contact with the wheels.

Tension then arises in the entire brake rigging, and when this occurs the friction moment between the screw shaft *S* and the female thread of the end jaw is greater than that between the friction plates *F* and the ratchet *R*. As a consequence further motion causes the slipping of the ratchet *R* between the friction plates *F*. A handle is used merely for the purpose of decreasing the length of the regulator when it is necessary to change brakeshoes. The pawl *P* is raised by means of the ring *r*, disengaging the friction clutch, and the regulator is easily screwed in to any desired length. The pipe *W* which is screwed and pinned to the handle 96 merely acts as a housing for the screw thread on the shafting. It slides along the hollow end jaw and has a clearance of but $\frac{1}{16}$ in. This hollow jaw, the pipe *W* and the center housing are all filled with a grease of such a consistency that it will neither melt in summer nor congeal in winter.

All moving parts of the Durson brake regulators are protected by grease-packed housings. They have been in use for years on the street railways of Copenhagen, Malmo and Stockholm, as well as on railway lines in the northern part of Europe. Conditions of snow and ice in these localities are very severe and prove the working qualities of the regulator under the most unfavorable circumstances.

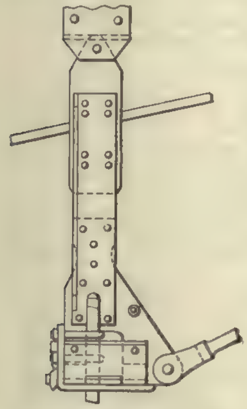
The only parts of the apparatus which are subject to wear are the friction plates and the circular ratchet. These surfaces are steel against steel. The construction of the regulator is such that even in case of an accident, it will continue to function as an adjustable turnbuckle until repairs can be made.

## Spring Leaves Tempered Separately

In connection with the short article relating to the hardening of elliptic springs as published in the July 16 issue of the ELECTRIC RAILWAY JOURNAL, page 102, the statement was made that the sets of leaves were bunched together and heated in an oil-fired furnace. This is in error in that the leaves are tempered separately and then assembled and banded. Also the furnace is coke-fired instead of being oil-fired, as previously stated.

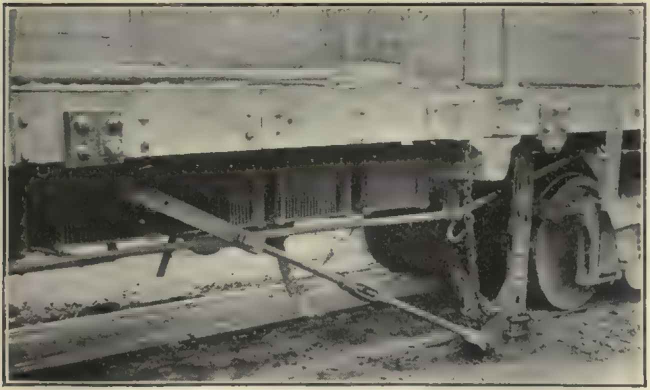
## Cutting Device for Asphalt Pavement

AN ATTACHMENT which can be put on any ordinary work car has been devised by the Market Street Railway of San Francisco for making a cut 1½ in. deep in asphalt pavement along the track. The cut can be made as the car moves along at a rate of 4 to 5 m.p.h. In addition to the saving in cost, a great advantage claimed for this device is its speed of operation. It has been used without interfering with the traffic on lines where service was being maintained on a three-minute headway. The method has been so successful that it has been adopted as standard throughout the system and no more pavement cuts along the track are being made by hand on reconstruction jobs.


FRAMEWORK FOR CUTTING TOOL

The cut is made by a tool which projects downward from a shoe carried by a work car and set to ride on the pavement at 18 in. or 24 in. from the rail head. The framework supporting the shoe consists of struts attached to the car at three points by means of pins and suitable mountings on the car body. The framework supporting the shoe can be attached to the mountings in about fifteen minutes. Once fastened in place, hinged joints make it possible to swing the device up out of the way under the car body, where it is held by hooks until the car arrives at the point where the work is to be done. The apparatus is so arranged that it can be used not only while the car is moving ahead in the usual direction of traffic, but also in the reverse direction by turning the apparatus around. This operation requires only about ten minutes

When ready to begin cutting it is only necessary to unhook the framework and swing it down so the shoe rests on the pavement. In this position the strut which thrusts the cutting tool down into the pavement is not yet vertical nor does it carry any weight. When the car moves forward a few inches, however, the hinge in the strut opens still wider, the strut takes a vertical position and, as it tilts the car body 2 or 3 in. out of plumb, takes a considerable weight off the car springs and the cutting tool sinks into the asphalt. The car can then move forward at a rate of 4 to 5 m.p.h. leaving a clean cut in the pavement. The depth of the cut can be adjusted by changing the bolts which attach the tool to the shoe; the usual depth is 1½ in. and the width ¾ in.


PAVEMENT CUTTING TOOL IN OPERATION

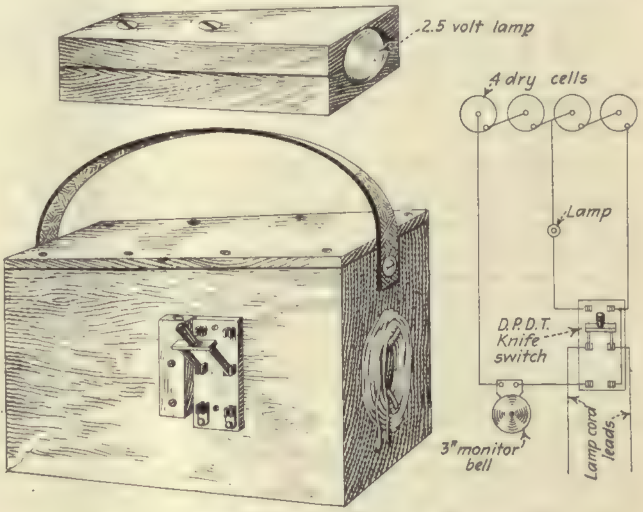
When cutting pavement in very cold winter weather it is sometimes necessary to put a load on the car to prevent the cutting tool from "riding" on the pavement surface. It was found that the best cutting tools were those forged from old carbon steel gads. These were superior to high-speed steel. The tool becomes dulled and requires to be replaced after cutting about 600 ft. in the summer time or 300 to 400 ft. in the winter time.

The design of the cutter was worked out by W. D. Chamberlin, principal assistant engineer. B. P. Legare is engineer of maintenance of way.

## Convenient Test Box

MOST shop men are familiar with some form of bell box or test and inspection box, which they use for testing out connections, locating trouble and ringing out circuits. It is sometimes more convenient to use a light for indicating when the circuit is closed than to rely on the ringing of a bell or buzzer. The box illustrated which provides for both a light and a bell has been found very convenient for this work.

The box on which the various testing apparatus is mounted and in which space is provided for four dry cells is made of ⅞-in. wood, and is 6½ in. x 9 in. x 11 in. in size. A cleat of sufficient size so that approximately 30 ft. of lamp cord can be conveniently wound up is fastened to one end of the box. The opposite end forms a convenient place for mounting the bell. A double pole double throw switch is necessary for cutting out either one or the other of the circuits which is not in use and the light can be located in a convenient position adjacent to the switch.



CONNECTIONS FOR TEST BOX

As test boxes are sometimes submitted to hard usage, it is desirable to protect the light in some manner. A satisfactory method has been found to mount the lamp in a block of wood about 1 in. square and 3 in. long, with a hole drilled in one end large enough to receive a small 2½-volt lamp. For convenience in mounting and connecting, the wooden block should be sawed in half and the wires from the lamp sockets can come out of two holes at the opposite end. By screwing the two halves together, all are protected. A leather handle for the top of the box is also a convenience for carrying. The accompanying illustration shows a form of box for this use, together with a wiring diagram for connecting four dry cells, so that all four will be used for ringing the bell and two of them for the lamp circuit.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Another Park Planned

### Philadelphia Rapid Transit Sees Money-Making Opportunity in Burd Home Tract

The Philadelphia (Pa.) Rapid Transit Company has made plain its purpose in purchasing the so-called Burd Home property in Delaware County. It is contemplated by the company to use the property as a public park and playground. The tract acquired consists of thirty-two acres lying west of the city limits. It was taken over in the interests of the Willow Grove Park Company, operating Willow Grove Park. The opinion of T. E. Mitten, president of the railway, is that the operation of the now proposed Burd Home Park will not lessen the attendance at Willow Grove because there are more people desirous of this kind of entertainment than both of these parks can supply.

#### NEW PARK HAS MANY ADVANTAGES

The Burd Home Park will be operated through the Willow Grove Park Company, to which the Philadelphia Rapid Transit has advanced $340,000 to make a down payment upon the land at Burd Home Park. It is explained that this sum is expected to be repaid during 1922 from the sale of the street frontage of the Burd Home Park and from the earnings of Willow Grove Park.

The Willow Grove Park Company's further indebtedness consists of $75,000 due in 1924 and $239,500 due in 1925. Both of these amounts are secured by purchase money mortgage upon the Burd Home Park property and the opinion of the management is that they can easily be paid from the future earnings of Willow Grove Park.

#### WILLOW GROVE PARK NOW PAYS

This proposal by the company to start a new park naturally has directed attention to the activities of the company at famous Willow Grove Park. This latter park, known all over the country, was opened in 1896, and up to the time of the coming of the Mitten management in Philadelphia had always been a loser. In 1910 it was operated at a loss of more than $25,000. The former management of the railway in 1910 made new long-term contracts with concessionaires for the control of all of the principal attractions. The railway did not receive sufficient revenue from the amusements to pay the cost of the music, the policing and the administration of the park.

The Mitten management at once directed itself to making Willow Grove Park self-supporting by a more effective administration. This has been accomplished with such effect that Willow Grove Park during the ten years, 1911 to 1920, earned a net income of $444,117. At the beginning of the 1921 season the Willow Grove Park Company purchased for $125,000 from the Ryan Amusement Company all of its amusements and buildings representing an investment of $320,000, which the concessionaire had a right to remove under his contract expiring in 1920 and 1921. The operation of these purchased concessions will, it is estimated, produce $125,000 of net earnings for the year 1921.

Mr. Mitten anticipates that Willow Grove Park should in 1922 and thereafter earn a net income in excess of $200,000 per annum. He is frank to say, however, that Willow Grove Park as a revenue producer for the Philadelphia Rapid Transit by way of added passengers carried has always proved a disappointment because of the cost of operating the long lines over the extreme grades encountered on the York Road and Glenside routes. With its present 7-cent cash fare with four tickets for 25 cents, with the added zone outside the city limits, the company is, however, now earning sufficient on the York Road and Glenside lines for them not to be a burden on the rest of the system.

---

## Indianapolis Company May Contract with City

Regulations under which the Indianapolis (Ind.) Street Railway shall operate, in the place of those specified in the franchise which the company surrendered several weeks ago, may yet be fixed by a contract between the city and the company.

Dr. Henry Jameson, chairman of the board of directors of the company, called on Mayor Jewett recently and before he left the City Hall he said the company had never taken the stand that it would not agree to a contract arrangement.

Samuel Ashby, Corporation Counsel for the city, and other city officials have understood since the last conference between the company officers and city officials that the company would not agree to the contract method of fixing the regulations.

Since the last conference, the jitney bus problem has become acute, and the company has asked the City Council to pass an ordinance regulating jitney bus competition. Some Council members, however, felt that the company should come to some agreement concerning regulation by the city before action was taken in regard to the jitney bus situation.

The city officials have felt that the contract method would be the best policy, both for the city and for the company.

## Report Against Radials

### Ontario Commission Reports Adversely Upon Great Transportation Project —Government Policy Fixed

An adverse report on the project for constructing and operating a number of electric railways by the Ontario Hydro-electric Commission, through an issue of bonds guaranteed by the government, has been made by the commission which was appointed by the provincial government to investigate the matter.

Decision against the construction of additional lines and development of the "radial" system is based on the present financial situation in the electric railroad industry generally, possible competition with the Canadian National Railways by paralleling lines and the desirability of testing the effect of highway development before undertaking a program of electric railway building.

The reasons that were cited were as follows:

> The financial condition of electric railways in Ontario and the United States has been precarious and unsatisfactory and the outlook discouraging; the evidence submitted indicates that the proposed electric railways would not be self-supporting. Their construction paralleling and competing with the Canadian National Railways system would be economically unsound, and a serious blow to the success of government ownership. Until the Chippawa power scheme, estimated to cost $60,000,000 or upward, is completed and shown to be self-supporting, the government would not be justified in endorsing the construction of an electric railway system at an initial estimated cost of $45,000,000.
>
> The endorsement of bonds by the province for systems of electric railways at the instance of the municipalities concerned is held highly dangerous and likely to lead the province into great financial difficulties, as it would give rise to demands for like accommodation from other localities which it would be hard to refuse. The expenditure of $25,000,000 on public highways in the province having been begun, it would be unwise to commence the construction of electric railways until the effect of highway improvement has been ascertained and the use of them by motor cars and trucks made clearly apparent. The rapidly increasing debts and financial commitments of the Dominion, Province and municipalities have aroused well-founded apprehension and are a cogent reason against the embarkation in the construction of the contemplated electric railways.

The report is signed by four of five members of the commission: Judge Sutherland, the chairman; General C. H. Mitchell, W. A. Amos and A. F. Macallum, C. E. The minority report by Frederick Bancroft, labor representative, controverts most of the conclusions arrived at in the majority report, recommending that the government should adopt the principle of publicly owned and operated electric railways. He states that unemployment conditions should be taken seriously into account and that the hydro-radial development would bring considerable relief.

It is anticipated that the report has determined the policy of the Drury Government with respect to the project.

## Interurban Objects to Relocating Tracks

The Columbus, Delaware & Marion Electric Company, Columbus, Ohio, has filed in the Ohio Supreme Court its answer to the orders of the state highway commissioner and the county commissioners of Franklin County requiring it to move its tracks from the right-hand side of the road to the opposite side while the stretch of highway between the north corporation line of Columbus and the village of Worthington is being improved. The ouster petition was entered by the Attorney-General.

The company charges that the Ohio state highway commissioner, among others, ignored the proposal of the state board of administration to furnish prison-made paving brick at $33.50 per thousand and awarded a contract for brick to a private concern at an increase in price of 30 per cent.

Claims are also set up that the commissioner failed to award the contract for the improvement of the highway within the ten-day period allowed by law; that the improvement was contracted for by the commissioner without the approval of the state highway advisory board—since abolished under the Ohio reorganization code, which became operative July 1—and that the commissioner had been enjoined from proceeding with the improvement through injunction proceedings brought before the Franklin County Common Pleas Court and allowed by that tribunal.

The stretch of road to be improved is one of the most important arteries of travel leading to and from Columbus and is located north of Columbus. The Attorney General's suit was brought to compel the railway to move its tracks temporarily in order to permit the improvement to be made.

## Engineer's Supplemental Report Presented

Mr. Ballard, the valuation expert for the city of New Orleans, La., in connection with the negotiations between the city and the New Orleans Railway & Light Company, presented his supplemental report on Aug. 13. Neither he nor the Commission Council would disclose the contents of his findings. Mr. Ballard intimated, however, that the recommendations made by him are in line with terms the Council believes the railway will accept. The Council was to confer on the report on Aug. 15.

The Council at its meeting on Aug. 9 appointed Wylie M. Barrow, special counsel in the injunction proceedings instituted by the receiver of the New Orleans Railway & Light Company. The suit was brought against the city, in the federal court, to restrain it from interfering with the collection of an 8-cent fare by the railway.

The appointment was made at the request of City Attorney Kittredge, who stated that the appointment of some one well versed in public utility matters as an aid to him in the conduct of the case was urgently needed, and that Mr. Barrow, as assistant to the Attorney General of the States and now acting as counsel for the State Railroad Commission, would be of service in the litigation pending before Special Maste Chaffe, recently appointed by Judge Foster to hear the evidence in the suit.

## 10 Per Cent Wage Cut in Dallas

The Dallas (Tex.) Railway has announced a reduction of 10 per cent in the pay of all motormen and conductors and employees in the mechanical and track departments of the company. Richard Meriwether, vice-president and general manager, declares that the reduction was made necessary through failure of the company to get a 7-cent fare from the city and the falling off of about $800 a day in revenues of the company. The reduction affects about 1,000 men and will clip something like $8,000 a month from the company's payroll.

The action was decided on after conferences with the employees, in the course of which the employees agreed to accept the reduction without protest. Platform men who have been receiving from 46 to 50 cents an hour, on two-man cars, and 50 to 54 cents an hour on the one-man cars, will get 5 cents an hour less under the new scale. Salaries of office employees who are paid by the month will also be reduced 10 per cent.

## Wage Cut Negotiated in Denver

Negotiations between the receiver of the Denver (Col.) Tramway and the representatives of the employees looking toward a wage readjustment were concluded on Aug. 9, when the latter accepted the proposition submitted to them. The new scale became effective on Aug. 16 and is to continue for a period of nine months: The former rates and the new platform wage scale in cents per hour follow:

| | Old Rate | New Rate |
|---|---|---|
| First three months.......... | 53 | 45 |
| Next nine months............ | 56 | 47 |
| Second year ................ | 58 | 50 |
| Third year and thereafter...... | — | 52 |

Present trainmen in the employ of the company for less than three months will receive, after the effective date, the second year rate or 50 cents an hour until the expiration of their respective three-months' period and thereafter the maximum rate of 52 cents an hour.

All other trainmen now in the service of the company will receive, after the effective date, the maximum rate or 52 cents an hour.

Trainmen entering service on or after Aug. 16 will receive the lowest rate in the wage scale.

A bonus system, based upon performance, is to be worked out by the employees, representatives and the management under which trainmen will be able to increase their monthly wage somewhat.

Reductions in the wage scales of all other hourly paid employees, corresponding to the reduction in the trainmen's scale, were also made effective on Aug. 16.

## 12 Per Cent Wage Cut in Haverhill

The pay of the 300 employes of the Massachusetts Northeastern Electric Railway, Haverhill, Mass., will be reduced 12 per cent, under the decision of the Arbitration Board filed Aug. 11.

When the wage agreement expired on May 1, the employees sought a continuation of the old rate of 60 cents an hour, and the street railway officials, through President David A. Belden, requested a cut of 10 cents.

P. F. Sullivan, ex-president of the Bay State Street Railway, Thomas H. Mahoney of Boston and James H. Vahey were appointed as arbitrators. The finding is signed by Messrs. Mahoney and Sullivan, with a dissenting opinion by Mr. Vahey.

The new scale is retroactive to May 1, and the new 54 4-5 cents per hour will continue in effect until May 1, next.

Arthur G. Wadleigh, one of the public trustees of the Eastern Massachusetts Street Railway, appeared as counsel for the Massachusetts Northeastern.

## Columbus Company Struggling Against Opposition

The troubles of the Columbus Railway, Power & Light Company, Columbus, Ohio, in its efforts to comply with the orders of the City Council to extend its lines to the suburb of Shepard are not yet over. Condemnation proceedings brought by the railway in the probate court of Franklin County, following unsuccessful negotiations with the Columbus, New Albany & Johnstown Traction Company to buy that company's line, extending from Columbus to Shepard, a distance of 1½ miles, have been held up by suit brought by the interurban railway, attacking the jurisdiction of the probate court.

The Franklin County Appellate Court, in which the injunction proceedings were brought by the Columbus, New Albany & Johnstown Traction Company decided against that line and in favor of the probate court, and the defeated traction company now seeks admission to the Supreme Court.

Its petition filed in the Ohio high court a few days ago attacks the judgment of the Appellate Court, and holds that the State Public Utilities Commission alone has jurisdiction.

## Before and After—In Chicago

What Chicago was fifty years ago in the days of horse-drawn rigs and what she is today with all the conveniences and luxuries which electricity can supply, is told in a recent pamphlet published by the Illinois Committee on Public Utility Information. "Chicago's Genii, The Public Utilities," reviews some historical data concerning the growth of the electric light, power and gas service in this great city. One of the best examples of Chicago's Half Century Miracle is the electric railway system which ranks first in the number of miles of tracks, number of cars and the number of passengers carried.

## Developments Being Awaited

### Detroit United Railway Makes No Moves to Comply With Recent Ouster Ordinance

Although important developments have been expected in Detroit relative to the railway situation since the ordinance was passed by the City Council, requiring the Detroit United Railway to remove its tracks from Fort Street and Woodward Avenue, no move has been made by the company toward complying with the ouster, and the company's contention still stands that the price named by the city for these lines will not be accepted.

### CONSTRUCTION WORK GOING AHEAD

Construction work on the municipal ownership lines is being carried out according to schedule, and the Charlevoix-Mack-Buchanan crosstown line has been extended about 2 miles and ten cars added. Other sections of the municipal lines will soon be in operation, according to Joseph S. Goodwin, general manager of the system. The extension of the crosstown line is the first since crossings were installed at intersections with the Detroit United Railway tracks and other railroads according to the plans authorized by the Michigan State Public Utilities Commission.

It was announced by the city officials that the extension of the municipal crosstown line increased the receipts from the system about 25 per cent. A statement of receipts and expenditures of the municipal lines for the first six months in 1921 is to be issued by the City Controller's office as soon as all power bills for the operation of the lines are received.

Mayor Couzens is negotiating with the Ontario Hydro-Electric Power Commission for electric power from the commission's Niagara development to operate the municipal lines in Detroit. Niagara power is already being used across the Detroit River in Windsor.

### OUSTER ORDINANCE ATTACKED

The starting of petitions calling for a referendum on the ouster ordinance has been intimated as the first move in a plan to terminate the Fort Street and Woodward Avenue ouster and to have the existing municipal lines operated by a private company. The plan is backed by a number of business men, many of them located on the two lines in question. The plan provides for the submission of two questions to the voters.

It is cited that under the referendum clause of the city charter, an ordinance passed by the City Council, such as the ouster ordinance, must be submitted to a vote of the people on presentation of a petition signed by 10 per cent of the voters. The other proposed action is an initiative ordinance repealing the municipal street railway ordinance, approved by the voters on April 5, 1920. The lease of the lines to a private company is proposed.

The reasons given by the proponents of the plan include the belief that the city's interest can best be served by halting the expenditure of city money for street railway purposes and by providing some feasible solution of the traction problem. In event of the filing of a petition providing for the referendum of the ouster ordinance, the ordinance, it is cited, will be automatically suspended until the city clerk has certified as to the number of signatures on the petition. If sufficient signatures have been obtained the ouster ordinance cannot become effective until after the ordinance has been ratified by the voters.

## Montreal Cut Put Into Effect

Developments in the Montreal (Que.) Tramways wage situation have followed a quiet course. On Aug. 16 the company put into effect its announced reduction of 12½ per cent. This cut it substituted for the 20 per cent reduction first proposed, against which the union representatives protested, contending for a reduction of only 10 per cent. The employees, of course, will not feel the effect of the cut until they receive their half-monthly pay checks on Aug. 31.

The company having failed to nominate a representative on the board of arbitration for which the employees applied to the Federal Department of Labor, the Department has appointed A. P. Frigon, a Montreal bond dealer, to act for the company. The men's representative, A. Brossard, a Montreal lawyer, will confer with Mr. Frigon with a view to choosing a third arbitrator, and if they cannot agree upon a nomination, the Department of Labor will select the third man.

The employees will remain at work under the reduced scale, pending the outcome of the arbitration. Under the Canadian legislation covering industrial disputes affecting public utilities, neither party is obliged to accept the award of an arbitration board, but the delay secured is a check upon rash action, and public opinion, based upon the presentation of both sides of the case before a properly-constituted tribunal, is generally a strong factor in bringing about ultimately an amicable settlement.

## Wages Reduced 6 Cents an Hour

A new wage agreement with the platform men of the San Francisco-Oakland Terminal Railways, Oakland, Cal., went into effect on Aug. 1. The new scale follows:

Traction Division — First three months, 46 cents an hour. Next nine months, 49 cents an hour. Second year and thereafter, 53 cents an hour.

Key Division—First three months, 48 cents an hour. Next nine months, 51 cents an hour. Second year and thereafter, 55 cents an hour.

This scale was incorrectly given in the ELECTRIC RAILWAY JOURNAL, issue of July 30.

## News Notes

**Suburban Strike Settled.**—The strike on the Syracuse & Suburban Railroad, Syracuse, N. Y., which has been in force two weeks, was ended on Aug. 16, and C. Loomis Allen, general manager of the road, accepted the offer of the men to return to work at a wage schedule of 45 cents an hour. The men struck when they quarreled with officials over terms of an impending arbitration agreement.

**No Wage Cut at Present.**—Officials of the Indiana Service Corporation, Fort Wayne, Ind., will not take up the matter of a wage cut on the city lines before the middle of September. President Feustel has announced that although the matter of a cut had been considered, a promise had been made to the employees that no such action would be taken definitely until the middle of September and the company has stated that it will hold to its promise.

**City Won't Appropriate Money.**—The new transit commission of New York City is unable to carry out its plan for the completion of transportation facilities owing to the city's holding up thirty-one contracts. At a recent meeting of the Board of Estimate the Mayor refused to have read the commission's request for approval of the urgently needed improvement. It was stated at the transit commission's office that the construction could not be started now until next spring as the Board of Estimate had adjourned its regular sessions until Sept. 30.

**Compromise in Macon.**—Trainmen of the Macon Railway & Light Company, Macon, Ga., have agreed to a wage cut of 4 cents an hour. The company wanted to cut the wages 6 cents an hour but agreed to compromise on 4 cents. The new scale ranges from 36 cents an hour for beginners to 49 cents for those who have been in the service for more than a year. The new agreement was signed by the men on Aug. 3. It will be binding for one year. The company's business has decreased 20 per cent during the past year compared with the previous year.

**Vacation Issue Advanced Again.**—In the wage adjustment of the platform men of the Community Traction Company, Toledo, Ohio, the two weeks' vacation with pay was given up by the men. After the election of a new business agent of the union, however, the men asked for re-opening of the vacation issue. The new agent claims that the men didn't understand what they were voting for when they approved the contract which eliminated the vacations. It is doubtful whether anything can be done at this date on the vacation issue. The contracts are signed and the action taken was carried out in accordance with the union rules.

# Financial and Corporate

## Merger in Indiana

### Utilities Serving Seventeen Counties to Be Brought Together Under One Head

Seven Indiana utilities propose to consolidate as the Indiana Electric Corporation. Authority to carry out the plan is asked in a petition which was filed with the Indiana Public Service Commission. There will be a public hearing before the Public Service Commission to give the commission information concerning the proposed merger. Articles of incorporation for the corporation, capitalized nominally at $10,000 have been filed in the office of the Secretary of State

The companies involved in the merger are the Merchants' Heat & Light Company, Indianapolis; the Indiana Railways & Light Company, Kokomo; the Elkhart Gas & Fuel Company; the Valparaiso Lighting Company; the Wabash Valley Electric Company, Clinton; the Putnam Electric Company, Greencastle, and the Cayuga Electric Company. The companies serve seventeen counties.

It is the ultimate intention of the men backing the enterprise to locate a power house on the Wabash River in Vigo County, probably north of Terre Haute, at an expenditure of several millions of dollars and to connect it with a system of transmission wires which will deliver electric current from the Indiana coal fields to many parts of the state. A triangular transmission line 300 miles long would distribute the current, one line extending from the central plant to Kokomo, another to Indianapolis and the third from Kokomo to Indianapolis.

The incorporators of the Indiana Electric Corporation are Joseph H. Brewer, Grand Rapids, Mich., president of the Merchants' Heat & Light Company; Charles O'Brien Murphy, vice-president and general manager of the Merchants' Heat & Light Company; Paul D. Birdsall, secretary of the Merchants company; Lex J. Kirkpatrick, Kokomo, vice-president of the Indiana Railways & Light Company; Marshall V. Robb, Clinton, secretary of the Wabash Valley Electric Company. The board of directors is made up of the incorporators. Mr. Brewer is president of the board of directors, Mr. Murphy is vice-president and treasurer, Mr. Kirkpatrick is a vice-president, and Mr. Birdsall is secretary.

The plan of financing embraces the acquisition of the various properties by issuing $4,000,000 in common stock and $1,850,000 in 8 per cent preferred stock; by issuing $3,250,000 in 7.5 per cent fifteen-year first and refunding bonds; by issuing $2,250,000 in 7.5 per cent seriel bonds maturing within fifteen years; by issuing $750,000 in one-year 8 per cent notes.

The bankers concerned in underwriting the securities of the new company are Halsey, Stuart & Company, the Harris Trust Company, and Paine, Webber & Company, all of Chicago.

It is planned to have the Indiana Electric Corporation acquire all the properties of the merged companies free from all liens. The petition for authority to complete the merger plan sets out that a sum of $600,000 will supply sufficient capital necessary for the efficient and economical operation of the utilities owned by the various corporations.

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## Ohio Electric Segregation Approved

Federal Judge John M. Killits at Toledo has issued an order returning auxiliary lines operated by the Ohio Electric Railway to independent control and absolved the Ohio Electric of all liens, demands and claims for rental by the subsidiary companies.

The order was issued after an agreement had been executed by the receivers for the Indiana, Columbus & Eastern Traction Company, The Columbus, Newark & Zanesville Electric Railway, and the Fort Wayne, Van Wert & Lima Traction Company.

B. J. Jones was appointed receiver for the Ohio Electric on Jan. 26. He asked for separation of the companies on June 15.

Judge Killits also approved a contract entered into by J. Harvey McClure, receiver for the Indiana, Columbus & Eastern Traction Company, with Day & Zimmerman, Inc., Philadelphia, who will operate the road. The engineering company will receive $1,000 a month and expenses as compensation.

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## Adrian Lines May Suspend

Discontinuance of service on the Adrian (Mich.) Street Railway, a Doherty property, is threatened on account of a boost in the price of electric current by the Toledo & Western Railway effective on Aug. 20.

The railway officials claim that the Adrian lines have been losing money for some time. An increase in fare from 5 to 10 cents about a year ago failed to make up for the loss of patronage by the growth of automobile travel.

The city lines have always paid about $2 a car per day for power service from the Toledo & Western, but this line is in the hands of receivers and has raised the price of energy.

It is said that the Adrian property, if junked, would net owners about $30,000. This is the price asked for the line.

There is a possibility of the city buying the line.

## Financial Authority Points Out D. U. R.'s Weak Spots

Lack of a comprehensive financing plan and "absentee ownership" are pointed out by the *Wall Street Journal* as the weak spots in the financial structure of the Detroit United Railway. The article, critical of the Detroit United Railway, appeared in the issue for Aug. 16.

An official of the Street Railway Commission is quoted as estimating that the Detroit United will be eliminated as a city transportation medium in Detroit within five years.

The *Wall Street Journal* considers the company's interurban lines "the largest and, perhaps, the most strategically stiuated in the country." It apparently sees in them the hope of the company for the future, for it says that "freed of political bickerings and expensive local campaigns the company, it is expected, will be in a more satisfactory position as a strictly interurban carrier."

Despite the arbitrary attitude of Mayor Couzens with respect to the very low price which he has fixed for the Woodward and Fort Street lines of the company the *Wall Street Journal* is of the opinion that "payment for lines taken over will finally of necessity be based on a just estimate of their value." In conclusion the paper says:

> There have been two weak points in Detroit United's financial structure—lack of a comprehensive financing plan and "absentee ownership." Practically all stock is held outside Detroit, much of it in Canada. It is not impossible that after the present political trouble is settled the company may find it advantageous to offer stock to Detroiters. The 7 per cent notes are due in 1923 and other obligations mature up to 1932. It is understood that a definite program is being worked out to provide for this situation.

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## Monongahela Stock Sells Well

The sale of preferred stock of the Monongahela Power & Railway Company, Fairmont, W. Va., which was started on May 16, 1921, has greatly exceeded expectations. To date the company has sold 18,746 shares, the par value of which is nearly $470,000. The shares which have been sold to old stockholders number 11,583 and there have been 7,163 new stockholders since the sale began.

The stockholders who bought their shares before June 25 have had their quarterly dividend checks mailed to them. The dividend is at the rate of 6 per cent per annum on the par value of the stock or nearly 8 per cent on the amount paid for the stock.

The additional stock has been sold largely throughout the territory where the company operates, that is to say, in Fairmont, Mannington, Clarksburg, Weston, Shinnston, Philippi also in Parkersburg and other places in that vicinity.

The company attributes the splendid success of this sale to the fact that it is the first opportunity that local people have had to become shareholders in the company. Under an arrangement which makes the acquisition of shares particularly attractive.

# Suspension and Receivership in Saginaw

## Failure to Curb Jitneys and to Grant Fare Relief Throws Line Into Bankruptcy

Since midnight of Aug. 10 citizens of Saginaw and Bay City, Mich., have been forced to rely entirely upon jitneys for their transportation, for at that time the cars of the Saginaw-Bay City Railway were put into the carhouses. On that day the company asked for a receiver and placed itself in bankruptcy. The proceedings took place in Bay City before George A. Marsten, referee in bankruptcy for the United States district court of the Eastern District of Michigan, Judge Arthur L. Tuttle of this court being out of the district. Otto Schupp, president of the Bank of Saginaw, was named receiver to conserve the property pending the appointment of a trustee.

THE petition in bankruptcy was filed by the Commonwealth Power, Railway & Light Company as the heaviest creditor, Booth & Boyd Lumber Company, Saginaw, and the Jennison Hardware Company, Bay City. The Commonwealth Company is also the owner of the bankrupt corporation.

The railway owes the Commonwealth Company $1,415,509 for money advanced as loans to pay for improvements, interest and operating expenses and thus keep the property going. The Commonwealth Company could not continue to put money into a steadily losing property.

The railway's total liabilities in bonds, notes and accounts payable and the loans from the Commonwealth, but exclusive of stock, are given as $3,588,851, with assets in excess of $5,000,000.

Following the decision of the creditors to file a petition in bankruptcy, the board of directors of the Saginaw-Bay City Railway, with all members present, adopted resolutions expresing willingness to have the company adjudged a bankrupt, as the only possible recourse.

John A. Cleveland, vice-president and general manager of the Saginaw-Bay City Railway, said:

> This action is deplorable, but as our people commonly know, it was inevitable. We had no other recourse. We could get no more money from the Commonwealth Company to carry us while struggling in a vain hope of being allowed to charge fares that would enable us to pay our own way. We have been trying for several years to make ends meet on inadequate fares and to get fares that would be reasonable and fair. We had hoped that the last two propositions submitted to our two cities would carry and save us from this fate, but the proposed new franchise in Saginaw and the proposed amendment to our franchise in Bay City, relieving us of paving, were decisively defeated. That was the climax and we are out of business as a consequence. Despite the fact that the people by their action said they wanted jitneys, I do not believe that either Saginaw or Bay City is a jitney town or wants to be known abroad as such.

More than 300 men are thrown out of employment in Saginaw and Bay City as a result of the bankruptcy.

Following default of interest due on Aug. 1 on Saginaw Valley Traction Company first mortgage 5 per cent bonds (a lien on the company's property in Saginaw and the interurban line to Bay City), petition was filed by the Commonwealth Power Railway & Light Company, which is the heaviest creditor and also owner of the entire capital stock of the Saginaw-Bay City Railway.

B. C. Cobb, vice-president of the Commonwealth Company, stated in part:

> The officials of the Commonwealth Power, Railway & Light Company, owners of all of the stock of the Saginaw-Bay City Railway, regret exceedingly, and I believe more than anyone else possibly can, the conditions that have made necessary the cessation of street railway service in Saginaw and Bay City. The Commonwealth company and the Saginaw-Bay City Railway have done everything in their power to keep the street cars running and they did keep them running and serving the people until the voters of both cities made it impossible to continue.
>
> The street railway situation in Saginaw and Bay City has been most unfortunate for the last three years. The street cars have been kept running, not only without any return on the investment, but with actual and large deficits.
>
> ### INCREASE INSUFFICIENT
>
> The majority of the city authorities in both cities have all along disregarded the fact that a public utility, like any other business, can continue to serve only as it is allowed to earn. Although our rates of fare were increased to some extent, the increase was never sufficient to enable us to cope with the increased cost of operation and, furthermore, we were forced to meet the unregulated and unfair jitney competition which city authorities not only allowed, but encouraged. The present results, therefore, were inevitable.
>
> During the last two years there have been several strikes and consequent interruptions in the street railway service in these two cities, owing to the company's inability to increase the wages of its men because it was not permitted to charge fares that would make it possible so to do.
>
> In June of this year the authorities of these two cities were plainly told by the company's officials that unless they gave relief in the way of increased fares, abandonment of the burdensome paving charges and the elimination of jitneys, the company could not continue to serve and would be forced into bankruptcy.
>
> The majority of the authorities in both cities positively refused to grant us this relief, but they did finally adopt and submit ordinances to the voters covering the fare and paving provisions promised, if the ordinances carried to regulate the jitneys. These ordinances were defeated in both cities.
>
> In addition to its original investment in the property upon which it received a return for only a short time, the Commonwealth company is a creditor of the Saginaw-Bay City Railway to a large amount for cash loaned it to pay the cost of improvements, interest and operating expenses. When the voters by their ballots said that the service rendered was no longer desired, there was nothing left for the Commonwealth company to do but stop putting up money, regardless of its faith in the future of the two cities and its belief that they are not jitney towns, and there was nothing that the Saginaw-Bay City Railway could do but quit.
>
> In addition to its loss on its original investment, the Commonwealth company is a common, unsecured creditor to the amount of $1,415,509. It is therefore a big loser and I am pleased to add, a good loser.
>
> ### FUTURE UP TO CITIES
>
> I repeat what the people of these cities know, that these companies have done everything in their power to continue service and avert this calamity not only to the companies, but to both cities and to every man, woman and child in both cities. It is a calamity to business. It is a calamity to labor, to every interest and phase of life and we deplore it.
>
> The future is up to these two cities. No reasonable street railway service can be maintained unless jitney competition is eliminated, reasonable fares charged and the company relieved of the heavy expense of paving.
>
> I do not believe in municipal ownership and operation of public utilities, but it may be considered that the present situation presents to Saginaw and Bay City an opportunity to acquire the railway property at a reasonable price; but having made the operation of the railway property impossible, they cannot obtain it for less than a reasonable price. So far as the Commonwealth Company is concerned, its net earnings will be more without these properties than with them operating at a loss.

It is understood that steps are being taken toward the formation of protective committees for the purpose of conserving interests of the bondholders.

The plight of the company has been pointed out repeatedly in the past. Things kept going from bad to worse, with the service tied up four times from March 23, 1919, to the time of the suspension. Some hope to the company was held out early in the present year by a series of conferences with city officials looking toward operation at service at cost. These conferences grew out of a tie up of the system last fall for twenty-four days. When the proposed new grant went before the people on July 19 it was voted down. Toward the close of the franchise negotiations on June 2, Mr. Cobb pointed out in unmistakable terms that the railway had reached the end of the rope so far as continuing to give service at a loss to itself was concerned. His warning then was:

> We want to continue giving Saginaw and Bay City street car service if we can, but we can't under existing circumstances. If we don't get the relief we have asked there is only one thing ahead—bankruptcy. This is no bluff—no "ifs" or "ands" about it—it is purely a business proposition. The company is at the end of its rope and unable to go any further unless it has help on all the things enumerated in this letter.

The City Council of Saginaw was to meet on the evening of Aug. 16. It was expected that an inquiry would be ordered to compel the company to resume service or at least to determine the binding effect of the franchise. Thus the Council, led by George Phoenix, finds itself in a hole. So long as the street cars were running that body had something to rail at, but it failed to realize that that was where it was strong and that its power for evil would end when the company went bankrupt and the cars were withdrawn. The members all realize it now, Pheonix more than any of the others. He now finds himself under the irksome necessity of providing a better, more adequate system of transportation than the city had when the cars were in operation. In other words, he is confronted by the impossible.

For a time the Mayor followed along with Phœnix and the others. Toward the last of the long controversy he did stand for a serious solution of the railway problem and against the jitneys. He is, therefore, in a position now to sit back and laugh at Phœnix and the others and to say: "I told you so."

All that the city now has at its command for transportation is a motly collection of nondescript cars and boxes, going by the name of buses and driven by irresponsibles. Some of these rattletraps are filled to the doors during rush hours, with people hanging on and standing.

Saginaw and Bay City are, of course, very dead towns at present. Industry is down; not more than 25 per cent of labor is employed and in this clear, pleasant weather people are not riding as they otherwise would. That may give the jitneys a chance to plug along for a while, but at that, the better element of people are not patronizing the autos as they did the street cars, and the Mayor says he is already getting letters from the people demanding street car service. Merchants are not yet saying much, though some of them admit some falling off in trade even now.

The railway carried about 6,000,000 passengers in Saginaw in a normal year and 4,500,000 in Bay City. With forty jitneys, seating sixteen passengers in regular service and ten on the sidelines for emergencies, as they say, it is not difficult to imagine how adequately Saginaw is being served. Bay City has still fewer buses operating and needs fewer, for if ever a town was dead and silent, it is.

### Mr. Seaman Still at It

John W. Seaman, a small stockholder who has filed many suits against the United Railways, St. Louis, Mo., only to be defeated in all the cases that have been decided, is seeking again to have Receiver Rolla Wells removed under the Adler suit appointment. The latest phase in much involved litigation came on Aug. 9, when Richard McCulloch and officers of the corporation asked the revocation of Federal Judge Wade's order which, if it stands, would give Mr. Seaman another day in court.

Judge Wade, acting in the absence of Judge Faris, who is on vacation, dismissed Mr. Seaman's petition for the appointment of a new receiver, but granted leave to renew the motion when Judge Faris returns. On Aug. 9 the defendant, the corporation, filed a motion to have Judge Wade rescind this grant, the corporation denying that there was any danger of a foreclosure on the bonds of the St. Louis & Suburban Railway, one of the constituent lines, or that Receiver Wells is being hampered in financing the receivership on account of doubt of the validity of his position under the Adler Bill, as alleged by Mr. Seaman.

Judge Wade in his ruling stated that he could see no emergency and that the litigation could wait upon the return of Judge Faris.

### $28,935,656 Lost by New Haven on Rhode Island Trolleys

The annual report of the New York, New Haven & Hartford Railroad for the year ended Dec. 31, 1920, states that during the year the Rhode Island trolley properties were disposed of by the trustees appointed by the federal courts. The loss sustained by the New Haven Company amounted to $28,935,656. This is written down in the profit and loss statement for the year. The income accounts for the remaining trolley properties are shown in the accompanying table. The results of the year's operations were unsatisfactory, but at present there are signs that the situation is improving.

The period of advancing costs continued into the year 1920 and increases in the rate of wages was made necessary on all of these electric roads. Efforts to obtain increases in revenue to offset the mounting costs were only partly successful, but toward the close of the year the economies that had been previously inaugurated together with the increased revenue accruing from passenger traffic due to more reasonable regulation in the operations of motor buses had turned the scale in favor of improved net revenues.

Weather conditions prevailing in the months of January, February and March, 1920, also made heavy inroads into the net revenues of all properties. Energetic efforts have been made to acquaint the public with the facts as to the financial condition of the company.

Note was also made of the appeal to the Connecticut Legislature for relief from burdensome obligations and for effective control of motor bus operation, and there is every belief that constructive legislation will soon be passed, in which the financial relief to be obtained, coupled with the increased revenue under the present rates of fare, should result in an improved financial showing for the ensuing year. This relief legislation has since been passed.

### $350,358 Net Despite Strike and Auto Competition

The first full year's report of the Brooklyn (N. Y.) City Railroad, which operates 217 miles of track, has been issued for the year ended June 30, 1921. Notwithstanding the strike of August, 1920, which cost the company, including direct expenses and loss of revenue, approximately $1,000,000, and competition from city controlled motor buses, the deficit after payment of operating expenses, taxes and income deductions covering fixed charges and rentals of tracks and cars was $350,858.

The report states that revenue from transportation shows a considerable increase over the corresponding period of the year previous, and with the reduction in wages, effective on Aug. 5, 1921, as well as the marked reduction in cost of materials there is a favorable outlook during the current year.

Passenger revenue amounted to $10,179,968, which together with revenue from miscellaneous sources, made the total operating revenue for the year $10,457,171; operating expenses were $9,715,667. The net after taxes assignable to railway operation, which totaled $500,515, was $240,989. Fixed charges were $362,269 and rent of tracks, cars, etc., $321,421. Non-operating income amounted to $91,843.

Traffic handled during the year amounted to 218,145,000 passengers, divided as follows: Revenue passengers, 205,002,000; transfer passengers, 11,205,000; free passengers, 1,938,000. The car-miles run were 23,600,000.

The report also refers to the service over the Williamsburgh Bridge, which the city authorities have announced they were to take over. At present through service as well as local service is operated. In case the city takes over this operation the railway company plans to discontinue all bridge service. This will result in an increased cost and inconvenience to all riders to Manhattan inasmuch as the bridge ride will cost an extra fare. The profit from the bridge locals, on which the fare is 2 cents, or three tickets for a nickel, were only $25,483, much less than the extra cost incurred in routing all lines entering the Williamsburgh Plaza to the Manhattan end of the bridge.

INCOME ACCOUNTS—TROLLEY LINES CONTROLLED BY NEW YORK, NEW HAVEN & HARTFORD RAILROAD

| | Berkshire St. Ry. | | The Connecticut Co. | | New York & Stamford Railway | | The Westchester Street Railroad* | | N. Y. Westchester & Boston Railway | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Actual | Per Cent Change Over 1919 | Actual | Per Cent Change Over 1919 | Actual | Per Cent Change Over 1919 | Actual | Per Cent Change Over 1919 | Actual | Per Cent Change Over 1919 |
| Operating revenues | $1,050,545 | 18.18 | $13,089,317 | 18.52 | $494,443 | 13.92 | $239,039 | 19.98 | $912,265 | 21.22 |
| Operating expenses | 1,037,645 | 19.52 | 12,417,141 | 34.78 | 457,324 | 17.60 | 276,006 | *18.09* | 829,765 | 25.22 |
| Net operating revenue | $12,900 | *4.98* | $672,176 | *63.40* | $37,119 | *17.80* | *$36,967* | 3.41 | $82,500 | *8.04* |
| Taxes | 45,205 | *2.98* | 725,767 | 17.12 | 24,260 | 2.46 | 12,081 | 1.37 | 170,234 | 15.18 |
| Operating income | *$33,305* | *13.21* | *$53,591* | *104.20* | $12,859 | *40.20* | *$49,048* | 2.27 | *$87,734* | *51.20* |
| Non-operating income | 5,715 | 237.50 | 11,340 | *94.60* | 2,156 | 254.50 | 665 | *24.30* | 13,511 | 71.40 |
| Gross income | *$26,590* | *117.80* | *$42,251* | *102.80* | $15,015 | *32.10* | *$48,383* | 1.88 | *$74,223* | *47.80* |
| Deductions from gross income | (*a*) 319,013 | 0.51 | 1,393,840 | 4.13 | (*b*) 100,962 | 3.60 | (*c*) 34,751 | *2.42* | (*d*) 1,732,959 | 3.59 |
| Net income for year | *$345,603* | *4.85* | *$1,436,091* | *1,431.00* | *$85,947* | *14.08* | *$83,134* | 2.15 | *$1,807,182* | *4 87* |
| Profit and loss account at end of year | *$2,099,977* | *16.00* | $1,051,763 | *60.4* | *$418,839* | *29.00* | *$439,282* | *23.80* | *$13,673,636* | 17.20 |

*This company is entirely separate from the New York, Westchester & Boston Railway. Figures include receiver's account for the 29th of February and ten months ended Dec. 31, 1920.

Includes interest accruing to the N. Y., N. H. & H. R.R., but not included in the income account of that company: (*a*) $213,550, (*b*) $42,533; (*c*) $26,784; (*d*) $815,979.

## Cuban Electric Road Sued

The Cienfuegos, Palmira & Cruces Electric Railway & Power Company, Cuba, is made defendant in a suit filed in the Common Pleas Court at Cincinnati, Ohio, by the Davidson Sulphate & Phosphate Company, Baltimore, Md., which seeks to recover $1,959,571 for breach of contract.

The Davidson company also attaches six electric cars under construction at the plant of the Cincinnati Car Company, which are the property of the defendant company.

The petition charges that the defendant failed to carry out a contract whereby railroad lines were to be constructed from the wharf at Cienfuegos to Caonao; from this point to Cumanayagua, and a branch line to a point in Cuba known as the Davidson Terminal. Under this agreement the plaintiffs were to have facilities for shipping 100,000 tons of material mined at its Cuban mines each year and were to have certain electric power facilities. As the result of the failure to carry out this agreement the phosphate company charges that it has been obliged to pay demurrage charges at Cuban ports due to delays in collecting its product for shipment. Filing of the suit in Cincinnati was due to the fact that the cars attached are being built there.

## Financial News Notes

**Rehabilitation Plan Fails.** — The Geist plan to rehabilitate the railway at Lafayette, Ind., has been abandoned following a meeting of the citizens' committee named about two weeks ago to offer $100,000 in preferred stock to local citizens. The prospects are that the present owners will abandon the line in the near future.

**Gold Notes Offered.**—Halsey, Stuart & Company and the National City Company are offering at 89½ and interest $500,000 fifteen-year 7 per cent secured sinking fund gold notes of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill. The notes known as Series "B" are dated June 15, 1921, and are due June 15, 1936.

**Abilene Line to Resume.**—The Abilene (Tex.) Street Railway, which was taken over by the American Public Service Company, will be put in operation again on Sept. 10. New cars will be put in use and current for operating the lines will be furnished from the American Public Service Company's new $1,000,000 power station soon to be put in operation. There are now 5 miles of track. An extension will be built at once to the new McMurray Methodist College, now under construction.

**Franchise Tax in Dispute.** — The Southern Indiana Gas & Electric Company, operating the city railway lines at Evansville, Ind., and the line between Princeton and Evansville, will not pay its franchise tax to the city of Evansville unless required to do so by the courts. Frank J. Haas, general manager of the company, maintains that the company is not operating under a franchise at the present time and should not pay the tax. The company surrendered its franchise in 1917, but continued to pay the franchise tax until 1920. It is believed the case will be taken to the courts for settlement.

**Exception Taken to Separate Foreclosure.**—The Guaranty Trust Company has filed a bill in the United States Court taking exception to the decision of Judge Orr in which he rules that the Southern Traction Company, one of three underlying companies of the Pittsburgh (Pa.) Railways, may foreclose on mortgage and operate its West End lines independently. It is contended that any such action might delay the proposed reorganization of the Pittsburgh Railways and would mean protracted litigation, as the Guaranty Trust Company would appeal to a higher court. It is also stated that the value of Pittsburgh Railways as a unified system will be impaired if broken up.

**Short Dallas Line Abandoned.**—The Dallas (Tex.) Railway has been authorized by the City Commission to abandon its Nettie Street line. The application of the company for authority to abandon this line set forth that it was eight blocks in length and extended to Commerce Street, but did not connect with the tracks on that street. Receipts of the line during the last few months have averaged about $120 a month, while the cost of operation has been $575 a month. Continued operation would require the expenditure of $2,500 on track improvements. Investigation by the Supervisor of Public Utilities shows that $7,428 was lost by the company through operation of this line during the fiscal year ended June 30, and that an average of 138 persons ride this line a day.

**Abandonment Planned in Spokane.**—The Washington Water Power Company, Spokane, Wash., has applied to the city for permission to cancel certain of its franchises. The idea of the company is to abandon some of its lines. According to the city officials, some of the company's principal lines outside of the business district are operated without franchise rights. W. E. Coman, second vice-president and general manager of the company, is reported to have said that the company was aware that some of its franchises had expired, but that it had no intention of applying for a renewal at this time. No part of the regular service will be disturbed by the discontinuance of the two lines included in the pending petition of the company. It was expected that the whole matter would be considered at a public hearing to be held on Aug. 16. A review of the fare and the jitney situations in Spokane is published on page 300 of this issue.

**Disappointing Outlook in Brazil.**—At the annual meeting of the Brazilian Traction, Light & Power Company in Toronto, Ont., on July 20, Vice-president Miller Lash told the shareholders that at the present rate of exchange, earnings for the first half of the present year were just about sufficient to provide for bond interest, sinking fund and preferred dividend with no substantial provision for capital expenditure. It was impossible to sell securities at the present time and to provide working capital. Mr. Lash pointed out that conditions were improving except for the drop in milreis, which had declined from 27½ cents in 1919, by over 50 per cent, to 10½ cents. He intimated that dividends would return with a 20-cent milreis. He pointed out, however, that in the last half of last year coal had cost $2,500,000 or $29.70 a ton. In the first half of this year it had dropped to $615,000 or $12.09 a ton. The drop in exchange, however, had almost wiped out this difference.

**Woonsocket Lines Sold.**—The Woonsocket properties of the Rhode Island Company, which include all the remaining property of the Rhode Island Company, Providence, R. I., were sold by Arthur A. Thomas, special master, on Aug. 6 to C. H. Mandeville, who announced he was bidding for the United Electric Railways. There will be $300,000 paid in cash, but there are a number of other obligations that Mr. Mandeville must meet or at least see that the new traction company meets. On Aug. 12 the Superior Court confirmed the sale. This approval of the sale by the court has the effect of bringing under the control of the United Electric Railways substantially all of the railway properties in the State, formerly operated by the Rhode Island Company. Furthermore, the transfer practically winds up the affairs of the Rhode Island Company, inasmuch as the new owners of the Woonsocket lines have agreed to assume, with reservations, the obligations of that company.

**Barcelona Net Up 14 Per Cent.**—According to the sixth annual report of the board of directors of the Barcelona Traction, Light & Power Company, Ltd., for the year ended Dec. 31, 1920, the net income from all sources including that derived on the Barcelona tramways was $2,731,769 as against $2,194,353 in the previous year, an increase of nearly 25 per cent. Interest on bonds for the year amounted to $1,963,485. Depreciation reserves were also made by the chief operating company. The railway itself set aside $293,364. The operating results of the Barcelona Tramway Company showed an increase in gross earnings of nearly 25 per cent over those of the previous year, but owing to a large increase in operating costs the increase in net earnings was only 14 per cent.

# Traffic and Transportation

## One-Man Operation Attacked

### New Cars Being Used to Make Political Capital in Milwaukee—Standard Cars In Use

Alleging that one-man safety car operation was unsafe, Alderman Carl Dietz of Milwaukee recently introduced a resolution in the Milwaukee Common Council calling upon the City Attorney to petition the Wisconsin Railroad Commission for an order prohibiting one-man cars from operating in the city of Milwaukee.

### COMPANY EXPLAINS POSITION

One-man operation was introduced in Milwaukee city service on the Thirty-fifth Street crosstown line about two months ago. On Aug. 1 it was extended by the Milwaukee Electric Railway & Light Company to the Twenty-seventh Street crosstown line. It is expected that it will be further extended to the other crosstown and light traffic lines of the company.

The matter was thrashed out on Aug. 5, 1921 at a hearing on the subject before the committee on railroads of the Council. Alderman Dietz, the introducer of the attacking resolution, urged its adoption almost entirely on safety grounds. He was supported by two or three other witnesses, but what opposition appeared seemed due to lack of familiarity with the safety equipment of the car rather than with the quality and quantity of service rendered by this type of equipment.

The company was represented at the hearing by its President, John I. Beggs, H. A. Mullett, assistant general manager, and W. A. Jackson, general attorney. The company's position as expressed by its representatives, was that due to the present state of unemployment, shorter hours which permit people to walk to and from work, and automobile competition, its railway revenues this year were smaller than during the previous year. The deficit would have to be made up either by increasing the rate of fare, lowering wages, reducing service, or effecting economies in operation.

While it was uncertain whether any one of these means would be sufficient to meet the situation alone, the company was first attempting to effect as many economies as possible, and for that reason had started one-man car operation.

### RECOMMENDED BY CITY'S UTILITY EXPERT

Attention was called by representatives of the company to the recommendation made some time ago by the city's public utility expert that one-man car operation be inaugurated for the sake of effecting economies. The inauguration of one-man car operation was also urged in the report just issued by the Public Utilities Acquisiton Committee of Milwaukee, which was signed, among others, by three of the leading members of its Common Council. The representatives of the company pointed out that one-man safety cars were in use all over the country and that they were apparently favored by municipally-owned railway utilities such as those of Detroit and Seattle.

H. A. Mullett, assistant general manager of the company, described the safety equipment of the cars which are being used in one-man service. This is the Standard Safety Car Devices Corporation equipment for one-man cars. The cars themselves are a number of a lot of 100 which the company has recently acquired. They were especially designed for use in Milwaukee and may be utilized either for two-man or one-man operation. These cars seat fifty-three persons, are unusually light, comfortable and good looking, and have produced a distinctly favorable impression on the patrons of the railway company.

### TESTIFIES FOR ONE-MAN CAR

Testimony in favor of the one-man safety car operation was given by E. J. Steinberg, resident engineer in Milwaukee for the Wisconsin Railroad Commission, who said that this type of service had been approved by the commission for the Thirty-fifth and the Twenty-seventh Street crosstown lines. He pointed out that the company was voluntarily giving better service on these lines with one-man cars than that required by commission standards of loading. Another witness who testified in favor of one-man operation also stressed the fact that the service on the Thirty-fifth Street line had been distinctly improved since the installation of one-man operation thereon. The point was made by this witness that if certain practices on the part of one-man car operators were deemed unsafe, these should be corrected, but that this was no reason why one-man car operation should be entirely prohibited.

At the end of the hearing further consideration of the matter was postponed for a period of thirty days in order that the new service may be tried out for a somewhat longer period of time before final judgment was passed on the matter. It is expected that the Common Council will uphold the company in its use of one-man safety cars in Milwaukee city service.

In an advertisement primarily intended to further the sale of its securities the company made the following comment on the attack upon its use of safety cars in city service:

> Strict economy from top to bottom of the organization with its more than 5,000 employes is the only means of assuring regular payment to our thousands of home investors of their income from the business, in times like these. Nobody has to be told we can't spend what we don't earn; that we can't hire more men than we have work for, nor pay excessive salaries, nor in any other way give out more than we can take in. This Company has paid every debt on the due date, in full, since it was organized twenty-five years ago; it has paid regular dividends to its shareholders for over twenty years, and it intends to continue doing so. To do this in a season of hard times means avoidance of waste and it means utilizing every practical means for saving. This is especially true of the street railway end of the business. It can be made to serve better and at less cost by using one-man safety cars instead of heavy two-man cars on some of the streets; so the Company, following the example of other cities where the change has pleased the public by giving more frequent service with equal safety, is gradually introducing this economy into its business.
>
> Some folks who have no knowledge of the business, and no stake in it, criticise such economies, in order to make political capital. It isn't a political matter at all. It is question of providing most and best service at least cost to the public that pays the bills—and this is a job for the company's engineers co-operating with the city's and the state's engineers. *We are not going to risk the safety of our customers.* You can bank on that. But we are going so far as possible, to introduce whatever tried and proved new methods will improve the service and reduce its cost.

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## Fare Advance Refused

A recent ruling of the State Corporation Commission continues in effect the 5-cent fare on the lines of the Lynchburg Traction & Light Company, Lynchburg, Va., for six months, at the end of which time the commission will again review the situation. In its petition the company asked for an 8-cent fare between the city and points outside. The opinion was written by Alexander Forward and was unanimously approved by the commission.

Some months ago the company gave notice that it would on May 11 apply to the commission for authority to publish and file, effective June 1, revised tariffs for railway service providing a uniform fare of 6 cents, with an alternative proposal that in the event permission for such 6-cent fare within the city limits of Lynchburg was not granted by the City Council, then application would be made for authority to charge an 8-cent fare applicable between points in the counties of Campbell and Bedford and also between points in those counties and points in the city.

The commission thereupon fixed the same date, May 11, for hearing the proposed fare advances of the company. A hearing was accordingly had on that day and upon motion of opponents a further hearing was given on June 2, when the evidence and argument having been fully presented, the entire matter was submitted to the commission.

Prior to the first hearing the City Council of Lynchburg, which is admitted by the company to have jurisdiction over railway fares within the city limits, refused to grant the increase to 6 cents, so that the company's application to the commission was based upon a proposed increase in fares between the city and outside and between points outside, of 8 cents per passenger.

In its finding the commission stated that in a period of declining costs a reduction in operating expenses could be anticipated and that this is a transition period and no one can foretell future price levels.

## Taylor Franchise Upheld

The franchise ordinance drafted by A. Merritt Taylor and recently submitted to the City Council of Norfolk, Va., for adoption has been vigorously defended by Messrs. Kerr, Wright and Doherty, leading business men of Norfolk and former members of the Public Utilities Commission, in a special report on the franchise made to the City Council on Aug. 3.

In their report these gentlemen refer to the severe criticism of the Taylor franchise, but point out that no constructive suggestions have been advanced as a substitute. They can see no better remedy than the one suggested by Mr. Taylor, a practical utilities operator, and acknowledge with indebtedness his comprehensive recommendations with respect to re-routing, improvement of present service and a new franchise.

The high points in the franchise ordinance drafted by Mr. Taylor which have caused much discussion were reviewed in the ELECTRIC RAILWAY JOURNAL, issue of Aug. 6.

## Commission Orders Amended Tariffs

The Public Utilities Commission of Utah has decided that the Utah Railway must amend its coal carrying tariffs, effective not later than Aug. 8, so as to prevent any discrimination against the Salt Lake & Utah, an electric interurban operating between Salt Lake City and Payson, Utah, and in favor of either the Denver & Rio Grande or the Los Angeles & Salt Lake railroad. The system of the electric railway comprises 75 miles of road.

The order came in the case brought by the Salt Lake & Utah, commonly known as the "Orem Line," against the Utah railway. It was complained that the Utah railway carries in its tariffs, with reference to joint rates on coal routed from mines on the Utah railway to and through Salt Lake, the proviso that the rates shall be applicable "only to traffic for delivery on team tracks of the Salt Lake & Utah Railroad, or industries served by it, when so routed by shipper."

The effect of this was that if the Salt Lake & Utah were to undertake to haul coal for shippers who were on the Denver & Rio Grande or the Los Angeles & Salt Lake (Salt Lake Route) tracks, additional switching charges had to be made, which the interurban had to absorb or else lose the traffic.

The Salt Lake Route intervened in the case by claiming that it had made a large joint investment with the Utah railway at the latter's Provo terminals, and also that the two rail lines owned 2,000 steel gondola coal cars in common.

These joint investments, it was contended, made the rails from the Utah railway mines to Salt Lake practically one complete railroad, and the intervenor claimed that it was entitled to consideration as such. The case was referred to in the ELECTRIC RAILWAY JOURNAL for July 16.

## Spokane Jitneys Run Wild

### City Shows Its Contempt for Utility Commission by Permitting Competition With Railway

Jitneys have been in operation in Spokane, Wash., since the latter part of June with the result that the gross revenues of the electric railways there have been reduced and the service on these lines materially curtailed. The Washington Public Service Department in May issued an order granting the appeal of the two Spokane railways, the Washington Water Power Company and the Spokane & Eastern Railway & Power Company, for an increase in fare from 6 cents to 8 cents.

The City Commissioners through Mayor Fleming had previously announced that in the event of such decision by the state, the city would release the jitneys in competition with the railways.

Losing their fight before the commission to prevent an increase in fare, the city officials prepared to put their threat into operation. Every effort was made to get them to reconsider this decision, but without avail. The state officials in their written opinion and decision on the case, expressed the hope that the city was not in earnest in such a determination and pointed out the ultimate harm that it would bring to Spokane.

### RAILWAY OFFERS COMPROMISE

The Chamber of Commerce roused itself and a committee of representative citizens, headed by Ben C. Holt, attempted to bring about a settlement and compromise. This committee secured from the railways a promise of a 7-cent fare dependent on the purchase of tickets, five for 35 cents. This compromise offer was curtly rejected and the jitneys released.

Every sort of a car was pressed into service in the first days of the jitney service. These are now giving way to buses which carry from ten to twenty passengers. A railway official estimated early this month that the two companies have suffered a loss of 21,000 fares daily or about one third of the normal patronage. Of this number it is the opinion that the jitneys are carrying about half, while the others are walking, being carried by friends in their cars or using their own machines.

This official said that so far as his company was concerned, the loss of patronage had been fully offset by the taking off of the tripper service. The tripper cars on this line are all two-man cars, so that with the increase in fare, the decrease in the payroll, the decrease in other costs and the sale of the juice for commercial use, this man figures that his company is just where it was before.

The fact remains, however, that with the jitneys in operation less than two months, they have made serious inroads on the railway business and forced considerable curtailment of service with the abandonment of certain unimportant lines already contemplated and asked for by the two companies.

The more conservative and far seeing of the citizens recognize the danger to real estate values in outlying districts and the inconvenience to those resident in them and strongly oppose the licensing of jitneys by the City Council. Spokane is a city with widely scattered residence districts, many of which frequented by the working class have no paved arteries. In winter and the wet weather of spring and fall, jitney service to these districts will be next to impossible. However, there is much sentiment favorable to the jitney and people are riding in them and suffering crowding and inconvenience cheerfully that they would not tolerate as a regular thing on the electric railway.

Neither the city officials nor the street railway officials give any indication of quitting the fight. Some of the railway employees incline to the opinion, however, that the only way to bring the matter to a speedy conclusion for the benefit of all concerned is to put the cars in the carhouses and demonstrate the inadequacy of the jitney service. More conservative counsel has so far prevailed and the companies are simply cutting down the service as rapidly as the jitney makes a line unprofitable.

## Floats Teach Safety

According to W. F. Hanna of the Safety Committee, No Accident Week in Maryland and especially in Baltimore, accomplished some fine results. No fatalities due to traffic accidents were recorded, although some accidents occurred.

From Sunday, July 17, through Friday, July 22, an intensive safety campaign was waged, bringing home to the residents of the city some graphic lessons on the need of safety. Each day contributed some special feature in a striking manner. One day was known as "Wagon and Truck Day," and another as "Children's Day." The slogan, "Don't Get Hurt," appeared on large white streamers attached to the front and rear bumpers of every trolley car. July 20, "Walk Right Day," featured a hospital scene called "The Jay Walkers' Ward."

Another interesting tableau was prepared at the Carroll Park Shops of the United Railways & Electric Company which showed on a flat car a wrecked automobile with a specter of death in front of it. The car operated through the streets of the city while mournful tunes were played by a school band.

The United Railways & Electric Company gave its hearty co-operation to the success of the drive. Mr. Cullen, assistant to the president of the Baltimore property, said that the campaign was a great success and that the lesson of the week would have a lasting effect.

## Fares Advanced Again in Toledo

Street Railway Commissioner W. E. Cann at Toledo, Ohio, has announced that on Aug. 20 fares will be jumped another notch by the Community Traction Company when ticket sales are changed from eight for 50 cents to six for 40 cents with the 7-cent cash fare and 1-cent transfer remaining. The commissioner says he believes this change will be the last necessary to bring back the stabilizing fund to normal. The last raise in fare was put into effect by the railway company on Aug. 1.

Only 25 per cent of the passengers are paying cash at the present time. This makes the average fare only a little more than 6¼ cents. On a straight 6-cent fare the railway system showed a deficit of approximately 1 cent per passenger.

As rapidly as economies of operation have been put into effect the car riding has decreased. The first twenty-five days of July brought in $12,638 less revenue than the same period in June. This ratio of decrease has been constant all summer. In February when the service-at-cost ordinance went into effect the revenues were averaging $12,000 daily. That figure at present is about $8,000.

## Connecticut Jitney Case Argued

Judges Martin T. Manton, Edwin S. Thomas and John C. Knox, in the court room of the Federal Building at New Haven, Conn., on Aug. 16, heard the application of the jitneymen of New Haven for an injunction against the enforcement of the new jitney law by the state authorities. It is expected that a decision will be rendered by Aug. 22. While the application was presented by local jitneymen at New Haven the decision of the court will affect the entire state.

Attorney Woodruff for the jitneymen claimed that the jitney operators by reason of the application of the law had suffered substantial loss while being prevented from using their machines to earn a living and that their constitutional rights had been denied them. He said that service furnished by the buses was demanded by public convenience and necessity. He attacked the arbitrary attitude of the commission, but Judge Manton said that the court had nothing to do with that. The question it must consider was whether or not the Legislature had the power to enact the present law.

Judge Walter C. Noyes, trustee of the Connecticut Company, argued against the granting of an injunction. He showed where the state has power to regulate traffic over its highways and to control it. The new statute of Connecticut, he pointed out, is similar to the statutes of other states which have been upheld already by the supreme courts of those states.

Attorney General Healy said that the plaintiff had an inadequate conception of the right and public policy of the state.

# Transportation News Notes

**Tokens in Use.**—The Vicksburg Light & Traction Company, Vicksburg, Miss., has replaced its paper tickets with metal tokens.

**Ticket Fare Cut.**—In Gadsden the Alabama Power Company has made a cut of 10 cents in the price of books of 16 tickets, selling them for 90 cents instead of $1.

**Children's Fares Reduced.**—The Alton, Granite & St. Louis Traction Company, Alton, Ill., has announced the use of metal tokens instead of tickets. A reduction in children's fares from 5 cents to 4 cents will be put into effect.

**Protests High Fare.**—A petition has been signed by many residents of Pottsville, Pa., and sent to the Public Service Commission requesting that body to require the Eastern Pennsylvania Railway to lower its fare between Pottsville and St. Clair. The petition declares that the distance is only 3 miles and that a 10-cent fare is not warranted in view of a cent-a-mile commutation rate on some railroads.

**Awards for Safety Records.**—In an effort to minimize accidents on the municipally-owned cars of St. Petersburg, Fla., R. E. Ludwig, director of utilities, has put into effect a bonus system under which motormen will receive cash awards or vacations for working for a stipulated period without accidents. Mr. Ludwig believes that this plan will not only lessen the number of accidents but will encourage the careful handling of the cars.

**Petitions for One-Man Cars.**—The Peoria Railway, a subsidiary of the Illinois Traction System, has presented to the Council an ordinance giving it the right to operate one-man cars in the city of Peoria. The company has furnished the Council with a list of cities where one-man operation of cars has been successful. The company further states that it wishes to extend its service but cannot do so as long as two men are required to operate cars.

**City's Expert Preparing Data.**—Harold M. Olmstead of the Delos F. Wilcox staff is going over the books of the Minneapolis (Minn.) Street Railway preparing for the city's argument at the hearing before the State Railroad & Warehouse Commission on Aug. 23, in which the city will combat a request of the railway for an emergency rate of 7 cents with four rides for 25 cents. A similar hearing is set for the same day in the case of the St. Paul City Railway, the two lines being component parts of the Twin City Rapid Transit Company, and their interests being similar as to rates of fare.

**Change in Fare Announced.**—The Grays Harbor Railway & Light Company, Aberdeen, Wash., has announced a change of fare in Aberdeen and Hoquiam from 6 cents within each of the cities, and a 12-cent fare between them, to a straight 10-cent fare. The change is announced as the result of recent jitney competition in the two cities and between them. The City Council of Aberdeen has instructed City Attorney A. E. Cross to protest the new fare before the Public Service Commission. According to a recent ruling of the State Department of Public Works, the company is allowed to charge a 10-cent cash fare, or an 8⅓-cent token fare. School rates remain unchanged.

# New Publications

### Roadway and Track

By W. F. Rench. Published by the Simmons Boardman Publishing Company, New York. 242 pages. Cloth.

This book is not one essentially on location, as are so many books on track, but partly on construction and more particularly on maintenance, care and protection of track. As such it should be very useful to the maintenance-of-way engineer. The writer was formerly supervisor of the Pennsylvania Railroad. The practice described is in a large measure that of that company.

### Proceedings of Society for the Promotion of Engineering Education

Proceedings of the twenty-eighth annual meeting of the society. F. I. Bishop, editor. University of Pittsburgh, Pittsburgh, Pa.

This volume covers the meeting held at the University of Michigan, June 29 to July 2, 1920, and includes a number of articles of interest to engineers engaged in electric railway work. Special attention was devoted at the meeting to the relation to technical schools of the utilities and the engineering industry.

### The Business Library

By Louise B. Krause, Librarian with H. M. Byllesby & Company, Chicago. 124 pages; illustrated. *Journal of Electricity and Western Industry*, San Francisco, Cal.

This is the second edition of this book. The first was published two years ago. Additions have been made to bring up to date the list of articles of value on the subject of business libraries. Some of the subjects covered are the organization of the library, the service expected to be rendered, how to file periodicals, government documents, trade catalogs, photographs and lantern slides. The methods advocated for the classification and cataloguing of the particles filed, the mechanical equipment needed and the qualifications essential for the business libraries are also covered in detail.

# Personal Mention

## Mr. Brewer, Promoter

### Grand Rapids Operator and Manager Putting Through Important Merger in Indiana

Joseph A. Brewer, Grand Rapids, Mich., president of the American Public Utilities Company, is the moving spirit in another consolidation of utilities. This time the properties concerned are all in Indiana. They operate in seventeen counties. The plans being advanced propose a considerable extension of the activities of the companies which it is intended to bring together under one head, and contemplate a power development scheme which will involve an expenditure of several millions of dollars in the erection of a plant in the Indiana coal field with transmission lines to Kokomo and Indianapolis. The new company will be known as the Indiana Electric Corporation. Mr. Brewer will be its president. Among the companies which will be taken over is the Indiana Railways & Light Company, of Kokomo.

"Joe" Brewer is a Michigander. He is not in "Who's Who," but that is a reflection on "Who's Who" rather than on "Joe." All the Central West knows Mr. Brewer intimately, and the East knows him by his work even if it has had only a small share heretofore in assisting him in his financial operations. With Mr. Brewer it is another case of truth being stranger than fiction. The annals of American business are, of course, replete with examples of men who have risen to prominence from humble beginnings, but there are angles to the achievements of Mr. Brewer that differentiate him from others.

Not all stenographers become public utility owners. Not all railroad clerks become railroad presidents or rise to prominence in the railroad world. This is mostly the fault of the stenographers and clerks. Mr. Brewer at fourteen was both stenographer and clerk at Grand Rapids. He learned the ropes rapidly but the position lacked the element of contact that Mr. Brewer craved. He decided to take a chance. Hieing himself off to Detroit he set up shop as a public stenographer. If there is any place in which to come into contact with persons of mercurial temperament it is as a public stenographer. Your customers range from the prima donna of the traveling theatrical company to —well, most anybody. You are supposed to react to the state of mind of your client. You learn a lot about human nature.

Having established this point of contact with the dear public, Mr. Brewer returned to Grand Rapids where soon he became a real caterer to the public by purchasing an interest in the Holland Gas Company. Thus is the mystery solved of where all the money went that was earned by one public stenographer. The public is usually ungrateful and gives grudgingly to the utility manager, but there seems to be something irresistible about the urge onward of the business. Thus it was only a short time until Mr. Brewer took over the Winona Gas Light & Coke Company, Winona, Minn. A little later he and Charles B. Kelsey, another utility operator, realized that they could do more by joining forces than by operating separately, so the firm of Kelsey, Brewer & Company was formed.

So far the talk about Mr. Brewer has been nothing but business. Mr. Brewer, however, plays as hard as he works. Northeast of Plainfield Village, Mich., Mr. Brewer has a farm of 360 acres. Here he does his playing by supervising one of the most complete establishments of its kind in the State. This is the man's principal hobby. Despite the demands made upon his time by his utility and banking connections, Mr. Brewer has served as president of the West Michigan State Fair, an enterprise of no mean proportions.

The financial manuals list Mr. Brewer as president of the American Public Utilities Company, president of the Jackson (Miss.) Public Service Company, president of the Wisconsin-Minnesota Light & Power Company and president of the Eastern Wisconsin Electric Company, to note just a few. Forty-five finds Mr. Brewer still going strong in the field of public service, as is attested by the plans being matured for the $18,000,000 consolidation in Indiana.

## H. C. DeCamp Leaves Sales Work to Become Operator

H. C. DeCamp, for the past eleven years a representative of the railway department, Westinghouse Electric & Manufacturing Company, Cincinnati office, has been appointed assistant general manager of the City Railway, Dayton, Ohio. Mr. DeCamp is very well known in railway circles, particularly in the Middle West, where he has for many years been active in the affairs of the Central Electric Railway Association, which he has served in various capacities from member of numerous committees to "parson" on the annual cruise this last summer. For many years he has had a hobby of the ways and means of promoting a better spirit and better salesmanship on the part of trainmen. He has felt that the trainmen have received less attention than they deserved, and at one time wrote a series of "Letters of a Retired Motorman to His Son," which were published in *Aera*. In his new position, with the full co-operation of the officers of the company, he expects to work out these ideas and endeavor to make the city railway one of the best operated companies in the country.

Mr. DeCamp has had a fund of both railway operating and selling experience. He first became interested in street railway matters in 1889, when he went to work for the General Electric Company. Subsequently he was connected with the old Utica & Mohawk Valley Railway, the Brooklyn Rapid Transit system, and the Third Avenue Railroad, thereafter entering the sales field. While engaged in selling, however, he has always kept up his interest in the operating field, particularly along the lines of efficient management and operation.

## Transit Engineer Will Study Foreign Methods

Robert Ridgway, chief engineer of the New York Transit Commission, sailed recently on the Olympic for a five weeks' stay abroad, where he will study methods of construction and operation of subways, rapid transit lines and urban transportation generally. Mr. Ridgway is expected to make a special study of the underground systems of London, Paris and Berlin, to obtain information that will help him in laying out new lines in this city and to solve the traction problem in New York. He went by direction of the commission. Clifford M. Holland, chief engineer of the New York and New Jersey Tunnel Commission, accompanied him.

## Harry S. Williams Joins Detroit Municipal Railway

Harry S. Williams has been made assistant superintendent of equipment of the Detroit municipal street railway system. Since 1914 he has been engaged in building work in Detroit, but prior to that was for many years in electric railway work. He started his railway experience in the construction department of the Lima-Honeoye Electric Railway, and became assistant superintendent when the construction of the line was completed. After three years he became connected with the construction work of the Oneida (N. Y.) Railway, and upon completion of this was transferred to Utica, N. Y., serving for a time in the power department and later in the mechanical department. At this time he had charge of the shops and carhouses of the Utica & Mohawk Valley Railway Company, now a part of the New York State Railways. Following the electrification of the West Shore Railroad from Utica to Syracuse, he was made electrical engineer of that property, with supervision of the power houses, overhead and third-rail, in addition to the car equipment. In 1910 he became chief engineer of the Peter Smith Heater Company, Detroit, serving in this capacity until 1914.

**Walter J. Devine** is now the secretary of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio. The position until recently was held by J. K. Trimble.

**Herbert Ware** has severed his connection with the Public Service Railway, at Camden, N. J., after a service of more than twenty-five years. For more than ten years he served as starter at the Pennsylvania terminal, at Camden, N. J. He was at one time assistant to the superintendent of employment at Camden. He started with the company as a motorman.

**Walter Jackson,** consulting engineer, has returned from a three months' study of transport conditions in Europe. In technical matters he paid particular attention to trackless trolley development and the amazing growth of motorbus operation both in city and country service. Visits were made to London, Paris, Vienna and Berlin in connection with changes in rates of fare, service-at-cost contracts and public ownership.

**George C. Graham** has been appointed superintendent of rolling stock and shop of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont. Prior to his present appointment he was engaged in commercial business in Hamilton, Ont., and before that he was for six years superintendent of rolling stock of the International Railway, Buffalo, N. Y. Until January, 1910, Mr. Graham was master mechanic of the United Traction Company, Albany, N. Y., when he resigned to become superintendent of car equipment and shops of the Los Angeles Pacific Company, Los Angeles, Cal.

## Obituary

**R. H. Taylor, Jr.,** manager of the Sault Ste. (Mich.) Traction Company, died very suddenly on Aug. 4 of heart failure. Mr. Taylor had held the position of manager of the Sault Ste. property since the reorganization of the road many years ago. During the World War he served as sergeant in the 160th depot brigade and is said to have had a splendid record.

**W. C. Connor,** former mayor of Dallas, Tex., and builder of the first street car line in the city died at Long Beach, Cal, recently, after an acute illness of only a few days, although he had been in failing health since 1906. Mr. Connor was prominently identified with the building of Dallas since 1870, having been four times Mayor, organizer of the first volunteer fire department, builder of the first electric light plant in Texas, the first ice factory, the first street car lines and a pioneer in many other lines of industry. The first street car line he built employed mule cars and the line ran up Main Street and out Ervay Street to Browder Springs. When the electric lines superseded the mule cars, Mr. Connor retained his interest in the lines and served for many years as vice-president of the Dallas Consolidated Street Railway until this property was conveyed to Stone & Webster.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Good Time to Build

### Important Engineering Firm Bases This Opinion on Survey of the Field

Dwight P. Robinson & Company, New York, have recently compiled and issued a chart showing price tendencies in nine groups of commodities from 1914 to July 1, 1921, based on the Bureau of Labor statistics. Commenting on these curves the company says in part:

> It is now evident that price recessions in many industries have been arrested. During a recent week more price increases than decreases were noted, the reverse of a situation which had existed for fifty-six consecutive weeks.
>
> Particular attention may be called to the curve for lumber and building materials, which has begun to straighten out. Building materials have taken a deflation of 139 points from their peak, as contrasted with the average deflation for all industries of 124 points, in spite of a more than normal demand for construction material. For the month of January contracts awarded were 6 per cent behind the January five-year average. For the period January to July 1 they were 9½ per cent ahead of the January to July 1 five-year average.
>
> There is not very much industrial construction going forward. When the large volume of this class of work starts, the increased demand will undoubtedly have a tendency to push building costs up, for the same laws of supply and demand obtain in the construction industry as in other lines and it is not reasonable to suppose that in the face of such activity there will be an appreciably greater deflation.
>
> The railroads are now practically assured of government aid and accordingly may soon be in the market for the equipment and materials they have so long needed. Heavy railroad purchases will act as a strong tonic to the business situation and will undoubtedly affect general prices.

## Activities of Trade Associations

An official statement having to do with the activities of trade associations will be issued the latter part of August. A promise to this effect was made by Commerce Secretary Hoover after a conference on the subject between Mr. Hoover and members of his staff with the Attorney-General and members of the Department of Justice staff. Pending the issuance of the statement, Mr. Hoover declines to comment. The Attorney-General stated that there are a great number of trade associations which are of much benefit to business and that the activities of the great majority of these organizations are not being questioned. He said the Department of Justice simply is trying to find if there are not some cases in which illegal activities are being carried forward under the guise of trade associations.

The probabilities are that the official statement which is to be issued will not go very far toward illuminating the twilight zone which covers a part of the field of some of the existing associations. Since the Supreme Court of the United States is expected to hand down, during the October term, an opinion in the hardwood lumber case, which may define some of the limits of the fields of the trade associations, it is not probable that any executive department is going to declare any very definite policy before the rendition of that opinion.

The Department of Commerce has ascertained that there are more than 5,800 trade and industrial organizations in the country.

## French Railway Orders Equipment

An order for electrical equipment amounting to $1,200,000 has been received by the Westinghouse Electric International Company from the Midi Railway of France. The order includes transformers, synchronous converters, lightning arresters and other substation equipment. The Midi Railway operates an extensive system starting from Bordeaux, running through Toulouse to Cette, with many branches. The section on which the Westinghouse equipment will be used extends from Pau to Toulouse in the Pyrenees Mountains near the Spanish border. The line passes through Tarbes and St. Gaudens, and has a total length of more than 100 miles.

## Large Turbine Generators Tested

The capacity of the testing room of the South Philadelphia works of the Westinghouse Electric & Manufacturing Company was taxed to capacity recently when 169,000 kw. of steam turbine generators were on the test floor at the same time. Nearly 150,000 kw. of this amount was made up of five turbines for some of the largest railway and power companies in the United States. These included a 35,000-kw. turbine for the Hellgate station of the United Electric Light & Power Company of New York, a 25,000-kw. turbine generator for the Gold Street Station of the Brooklyn Edison Company, a 25,000-kw. turbine for the Virginia Power Company, Cabin Creek, Va.; a 35,000-kw. turbine for the Calumet station of the Commonwealth Edison Company, Chicago; a 25,000-kw. turbine for the United Electric Light Company, Springfield, Mass., and a 10,000-kw. turbine for the American Rolling Mills, Middletown, Ohio.

## Electrification Data Needed

A technical commission in Portugal (No. 35,284) desires to be placed in communication with firms in the United States engaged in undertakings such as the electrification of railways and transmission of electrical power and to secure literature and catalogs from manufacturers of material and accessories pertaining thereto.

## Rolling Stock

**The Hydro-Electric Railway, Windsor, Ont.,** intends to rehabilitate its present rolling stock and buy twenty new cars.

**The New York, New Haven and Hartford Railroad, New Haven, Conn.,** mentioned in the July 30 issue as having placed an order with the Osgood-Bradley Car Company for eight steel motor cars and for fourteen trailer cars of the same type, has given the following data on these cars:

| | |
|---|---|
| Number of cars ordered (motor) | 8 |
| Date of order | Dec., 1920 |
| Date of delivery | Dec., 1921 |
| Builder of car body | Osgood-Bradley Car Company |
| Type of car | Motor-passenger |
| Seating capacity | 84 |
| Weight— | |
| Car body | 68,500 lb. |
| Trucks with motors | 69,700 lb. |
| Equipment | 32,000 lb. |
| Total | 170,200 lb. |
| Bolster centers, length | 47 ft. 7½ in. |
| Length over all | 72 ft. 7¼ in. |
| Truck wheelbase | 8 ft. 1 in. |
| Width over all | 9 ft. 8 5/16 in. |
| Height to top of roof | 13 ft. 3⅝ in. |
| Body | All steel |
| Interior trim | Steel and agasote |
| Headlining | Agasote |
| Roof | Monitor |
| Air brakes | Westinghouse AMU-2-16 |
| Armature bearings | Brass |
| Axles | O. H. Steel |
| Car signal system | Westinghouse Air |
| Car lighting | Adams & Westlake or Safety Company |
| Center bearings | M. C. B. |
| Side bearings | Creco roller |
| Conduits and junction boxes | Osgood-Bradley pressed steel boxes |
| Control | Westinghouse multiple unit |
| Couplers | National Malleable Castings Company—extended horn |
| Curtain fixtures | National—cam type |
| Curtain material | Pantasote |
| Gears and pinions | Nuttall BP |
| Heater equipment | Consolidated—52 Truss plank—26 seat |
| Headlights | Golden glow—12-in. reflector |
| Journal bearings | Brass |
| Journal boxes | Cast steel 6½ in. x 11 in. |
| Lightning arresters | Westinghouse 379-s 3-time element relay with 392 overload trip |
| Motors | 6 cars—4 Westinghouse 409-D<br>2 cars—4 Westinghouse 417 |
| Sash fixtures | National |
| Seats | Heywood Brothers & Wakefield |
| Seating material | Pantasote |
| Slack adjuster | American type L |
| Springs | Triple elliptic |
| Step treads | Feralun |
| Trucks | Standard Motor Truck Company |
| Ventilators | Osgood-Bradley |
| Wheels | Steel-tired 42-in. |
| Draft gear | Radial for operation on loop at lower level of Grand Central Terminal |
| Current collector | Railroad Company's Standard A.C. pantagraph and D.C. third-rail shoes |

The body design of the trail cars is identical with that of the motor cars. The trail cars, weighing 104,000 pounds, are equipped with Westinghouse ATU-1-16 air brakes. The wheelbase of the truck is 1 in. shorter than that of the motor cars. The journal boxes are 5 in. x 9 in., while the wheels are 36-in. forged steel instead of 42-in. steel-tired. The American type J slack adjuster is used instead of the type L used on the motor cars.

## Franchises

**Shawnee-Tecumseh (Okla.) Traction Copany,** is resetting its tracks in Tecumseh. When the franchise was granted the company it provided for a double-track line which was never built. The line was built to one side of the street and it is now being removed to the center of the street preparatory to paving the road. The company has also replaced the wooden structure across the North Canadian River with a new steel girder bridge.

**Fort Worth-Lake Worth (Tex.) Interurban,** has been granted a permit by the County Commissioner's Court of Tarrant County sitting at Fort Worth, Tex., for the construction of an interurban line from Fort Worth to Lake Worth, a distance of about ten miles. The permit was granted to A. P. Barrett, W. P. Welty and J. H. Jackson, and it is proposed to build the line from the terminus of the Rosen Heights Street car line to the Municipal Bathing Beach on Lake Worth. The lake is the outdoor resort not only for the City of Fort Worth but for all the country within a hundred miles of the city. The cost of the line, according to Mr. Barrett, is estimated at $350,000.

## Track and Roadway

**The Columbus (Ga.) Railroad** is rebuilding its track on the North Highland line using heavier rails and additional switches. This was found necessary in order to operate an increased schedule. A loop is also being constructed at the end of the line.

**United Railways & Electric Company, Baltimore, Md.,** will extend its line one mile from Carney, Md.

**Winnipeg (Man.) Electric Railway,** is tearing up its old tracks on Main Street between Sutherland and Selkirk Avenue and replacing them by new 85-lb. heavy type standard rail. The ties are also being renewed, and special intersections put in at Dufferin and Main, Euclid and Main, and Selkirk and Main. Work on improving the tracks on Sherbrooke street and Sargent Avenue is also proceeding.

**Public Service Railway, Newark, N. J.,** will remove its tracks in the middle of Valleybrook Avenue, Lyndhurst, N. J., and install a double track system in that thoroughfare.

**Phillipsburg (N. J.) Transit Company,** has been directed by the city commission to make improvements between the tracks on Lewis, Heckman and South Main Streets, Phillipsburg.

**Oklahoma Railway, Oklahoma City, Okla.,** has met with the approval of the citizens at a hearing before the corporation commission in its plan to spend $100,000 in improvements and extensions, with the exception of the proposal of the company to abandon a section of track on Twenty-eighth Street. Other changes will be approved, including the consolidation of the Capitol and Culbertson lines, in a way to improve the service.

**Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa.,** is making a number of improvements to the bridge spanning the Neshaminy Creek at Croyden, Pa. and the bridge is now closed to traffic.

**Wichita Falls (Tex.) Traction Company,** will at once begin construction on the new Ninth Street line, from Floral Heights into the business district of the city. Permit for this line was granted by the City Council recently. The new line will traverse Ninth Street from Broad Street and will eliminate a loop of about twenty blocks, thus effecting a material saving in the operation of cars to the Floral Heights section. The company also announces that a new line will be built to serve the southern part of the city which has been developed since the Southland line was built several years ago.

**Dallas-Terrell (Tex.) Interurban Railway** will enter Dallas via Forney Avenue, Stonewall Street and Parry Avenue, according to Richard Meriwether, vice-president and general manager of the Dallas Railway and also vice-president of the interurban company. Application will soon be made to the City Commission of Dallas for trackage rights. Work of grading for the line between Dallas and Terrell is going forward, Mr. Meriwether said, but several small stretches of right-of-way must be secured before the grading work can be completed.

**Charlottesville & Albemarle Railway, Charlottesville, Va.,** will enlarge Jefferson Park.

## Power Houses, Shops and Buildings

**Pacific Gas & Electric Company, Sacramento, Cal.,** has installed a new 12,500-kw. steam turbo-generator at Station "C," Oakland. It is a General Electric machine.

**Interstate Public Service Company, Indianapolis, Ind.,** has selected a tentative site for the construction of a dam on Fourteen Mile Creek, near Charlestown, Ind., with which to provide power for an extension of the company's lines from Charlestown through New Washington, Madison, and thence to Aurora, connecting with the line to Cincinnati.

**Dominion Power & Transmission Company, Hamilton, Ont.,** suffered a loss of more than $75,000 when its substation on Victoria Avenue, North Hamilton, was struck by lightning during a recent storm. Repair work is well under way.

## Trade Notes

**The Michigan Railroad Company, Jackson, Mich.,** has equipped fifty-four of its cars with the new Root spring lifeguard manufactured by the Root Spring Scraper Company, Kalamazoo, Mich.

**J. E. Slimp,** after a two months' association with the E. T. Chapin Company, as manager of sales, located at Chicago, has resigned. The E. T. Chapin Company is a producer of Western red cedar poles and piling and has its home office at Spokane, Wash.

**The Belden Manufacturing Company, Chicago, Ill.,** is now supplying standard magnet wire in even quantities of ¼, ½ and 1 lb. on small substantial fiber spools, the charge for which is very small. This makes the method of handling quite convenient where small quantities are used.

**The Webster & Perks Tool Company, Springfield, Ohio,** announces that the grinding and polishing stand and accessory department of its business has been sold in its entirety to the Hill-Curtis Company, Kalamazoo, Mich., which will continue this business. The Webster & Perks Tool Company will hereafter concentrate upon the exclusive manufacture and sale of the W&P line of universal and plain cylindrical grinding machinery.

**The Globe Ticket Company, Philadelphia, Pa.,** celebrated its thirtieth anniversary of incorporation on June 25 by an excursion of its employees, numbering about 450, to Atlantic City. All were entertained as guests of W. E. Hering, president of the company. This company has just enlarged its factory space by almost 20 per cent, so that it now occupies eight floors of its building at 112-114 North Twelfth Street, Philadelphia.

**The Root Spring Scraper Company, Kalamazoo, Mich.,** manufacturers of spring snow scrapers and lifeguards, reports that shipment was recently made of four hundred scrapers for the new cars now being built for the Detroit Municipal Railway. The scrapers were delivered to the manufacturers of the cars who will install them. Several smaller orders from old users of the equipment have also been filled.

**Albert Taylor,** manager North Atlantic District, the Electric Storage Battery Company, Philadelphia, died suddenly in New York on July 6. Mr. Taylor, who was a graduate of Princeton University, joined the Electric Storage Battery Company in 1898 as a salesman in its New York office, having previously been with the Edison General Electric Company, the United States Electric Company (absorbed by Westinghouse), and the Stanley Electric Manufacturing Company. In January, 1900, he was made assistant manager of the company's New York office and two months later became manager. In February, 1920, Mr. Taylor was selected as manager for the North Atlantic District, embracing branches in New York, Rochester and Boston, and covering the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York and part of New Jersey.

## New Advertising Literature

**The Ward Leonard Electric Company, Mount Vernon, N. Y.,** has issued a booklet describing its "vitrohm" (vitreous enameled) resistor units.

**The Delta-Star Electric Company, Chicago, Ill.,** is distributing bulletin No. 36, devoted to its high-tension air-brake switch and outdoor substation equipment. This bulletin contains forty-eight pages and will be mailed upon request.

**The William B. Scaife & Sons Company, Oakmont, Pa.,** has issued a booklet entitled "Facts About Water Purification for Steam Generation." This treats of the various substances to be found in water used for steam generation and describes method of softening and purifying the water to prevent scale and corrosion in the boiler.

**The Thompson Electric Company, Cleveland, Ohio,** has issued a folder describing its safety disconnecting hangers, which enable high lamps to be lowered away from the electric circuit for cleaning and renewals. The use of these hangers makes reflector and lamp cleaning easy and safe and much more likely to be done since they bring this maintenance work down to the ground instead of requiring some one to climb to it.

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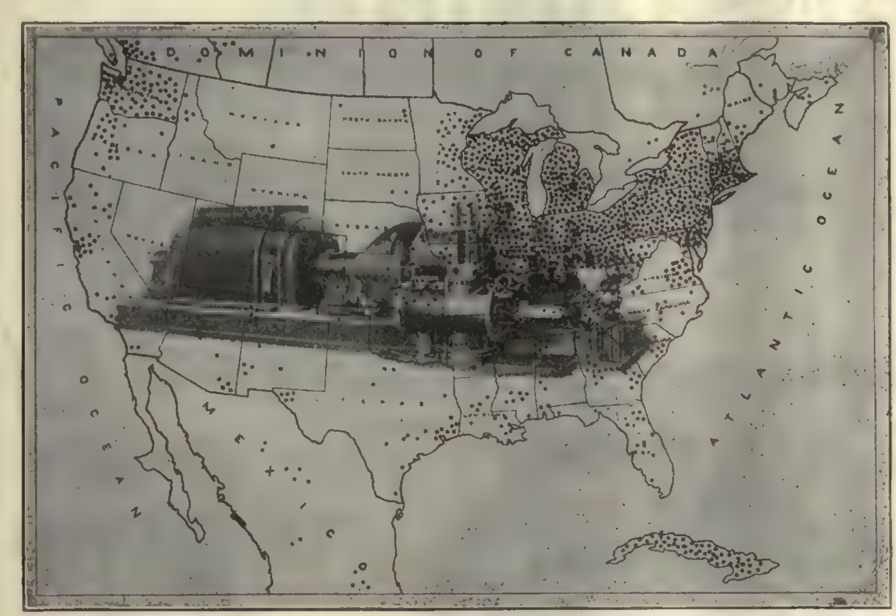

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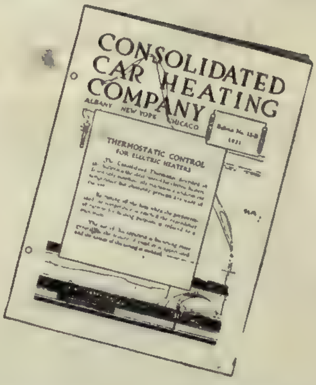

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**Longitudinal**

## The Kind That You Know Will Give Satisfaction

Consolidated Electric Heaters positively heat a car — comfort to your patrons is guaranteed. In addition, they are light in weight—strong in construction—and efficient in operation. All parts are quickly and easily removable.

For many years Consolidated Heaters and accessories have stood the test of time. As a result, Consolidated Electric Heaters are recognized nearly everywhere as the ideal car heating equipment.

Maintenance a minimum.

**Consolidated Car Heating Company**

**Albany New York Chicago**

Actual Test of P&H Guaranteed Penetration Process poles before shipment. See plug below.

# Best by Test

A SIMPLE TEST of poles treated by the P&H Guaranteed Penetration Process will prove conclusively our guarantee.

Test the poles treated by our process—prove to yourself that you are getting the full penetration. The more rigid the test, the better satisfied you will be.

Remember our guarantee is your safeguard. We urge you to test P & H Guaranteed Penetration Process poles.

Your interests will be safeguarded by demanding P&H Guaranteed Penetration Process poles. Don't be satisfied with any other.

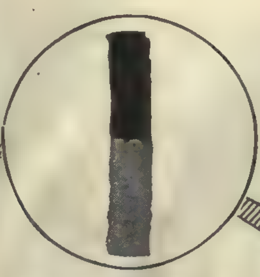
P & H Guaranteed Penetration Process is the original guaranteed process and is produced only by the Page & Hill Co.

*Write for Full Particulars.*

**PAGE & HILL CO.**
**Minneapolis, Minn.**

BRANCH OFFICES:
Times Bldg., NEW YORK, N. Y.
717 Bryant Bldg., KANSAS CITY, MO.
19 So. LaSalle, CHICAGO, ILL.
1111 Carter Bldg., HOUSTON, TEXAS
511 Sumpter Bldg., DALLAS, TEXAS
1416 Starks Bldg., LOUISVILLE, KY.

*Originators of the P & H Guaranteed Penetration Process. Producers, manufacturers, and foremost in the Butt-Treatment of Cedar Poles.*



Actual size photograph of plug removed from the guaranteed area of the pole shown above.

*This disc countersunk on the butt-end of every pole Butt-Treated by the P & H Guaranteed Penetration Process is your assurance of one-half inch penetration.*

Butt-Treated
BY
PAGE & HILL Co.
1921
GUARANTEED
One-Half Inch
PENETRATION

Save from $2000 to $6000

Description

Dayton Resilient Ties are made with two wood blocks imbedded in a cushion of asphalt, contained in iron boxes. These blocks support the rails and are fastened to them with bolts and clips. The bolts run through the steel angles, through the block and clips and hold all together with perfect security.

The iron boxes and blocks are tied together by two angle irons to hold the gauge of the track and serve as a reinforcement in the concrete. The joint tie provides more than double the bearing surface at the rail joint and has a steel plate for additional strength. This plate also acts as a welding base, eliminating the necessity of bonding.

The resilient wood and asphalt of these ties absorbs all the shocks and vibrations which directly cause the disintegration of the foundation, the heaving and settling of the joints and the resulting track failure.

DAYTON

# on every Mile of New Track

If you can save more than $6,000 a mile over wood ties in concrete foundation or—

If you can save more than $2,000 a mile over wood ties in gravel ballast and—

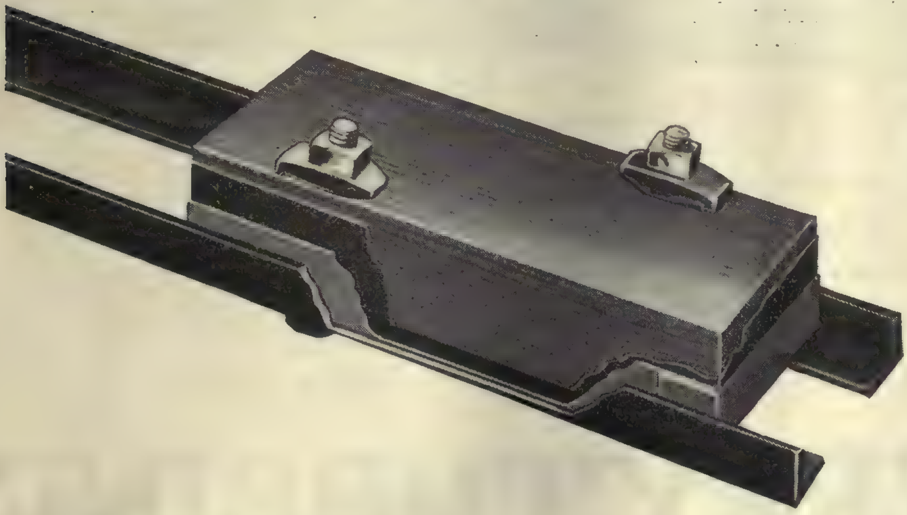
At the same time get a better track than by any other known construction—

Why not go ahead and relay that stretch of bad track now?

***Dayton Resilient Ties***

1. Reduce first cost
2. Give longer life to track
3. Reduce track and paving repairs
4. Reduce upkeep of rolling stock
5. Reduce traffic noise

You want to save money on that next track job and you want to get a better track—have the absolute facts about track construction laid before you. Just tear off the coupon in the corner and hand it to your stenographer. It will bring to you complete literature on Dayton Resilient Ties and tell you about the experience of others in the saving through their use.



The Dayton
Mechanical Tie
Company
707 Commercial Building
Dayton, Ohio

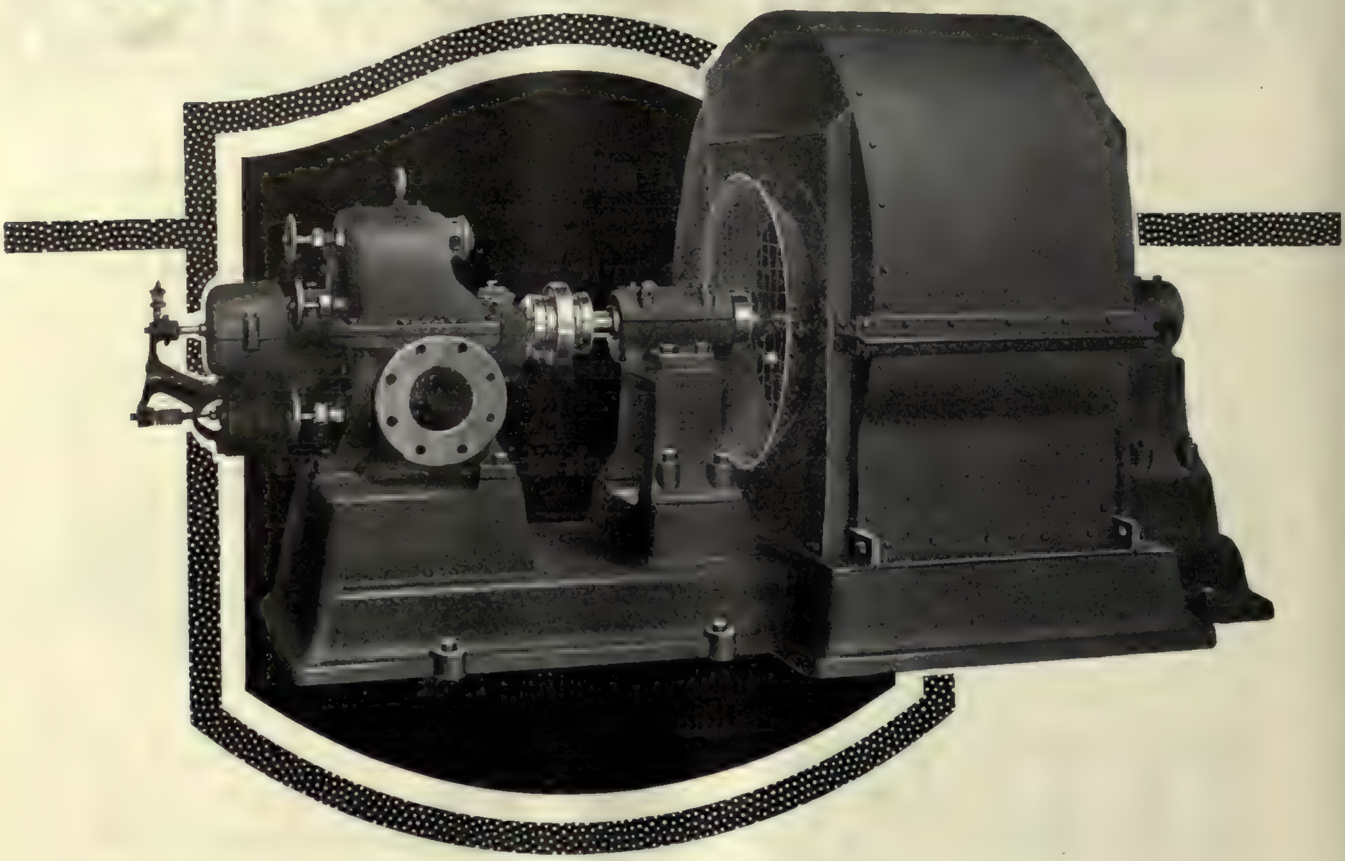
**Resilient**
**TIE**

PIN TO LETTER

**Dayton Mechanical Tie Co.**
**707 Commercial Bldg.,**
**Dayton, Ohio**

Without obligation, please send me full information about your Dayton Resilient Ties.

**for Forced or Induced Draft**



ONE of the most essential characteristics of the prime mover of a blower unit is its adaptability to speed regulation. Regulation obtained by means of throttling the air from a forced draft fan is detrimental to plant efficiency. Regulation which maintains the most efficient blower speed for a given draft requirement avoids the detrimental throttling and permits high combustion efficiency. In many installations with modern stokers Terry turbines have been controlled in this manner and have given dependable as well as economical service. This is why so many designing and operating engineers say that for best results for forced or induced draft service you should

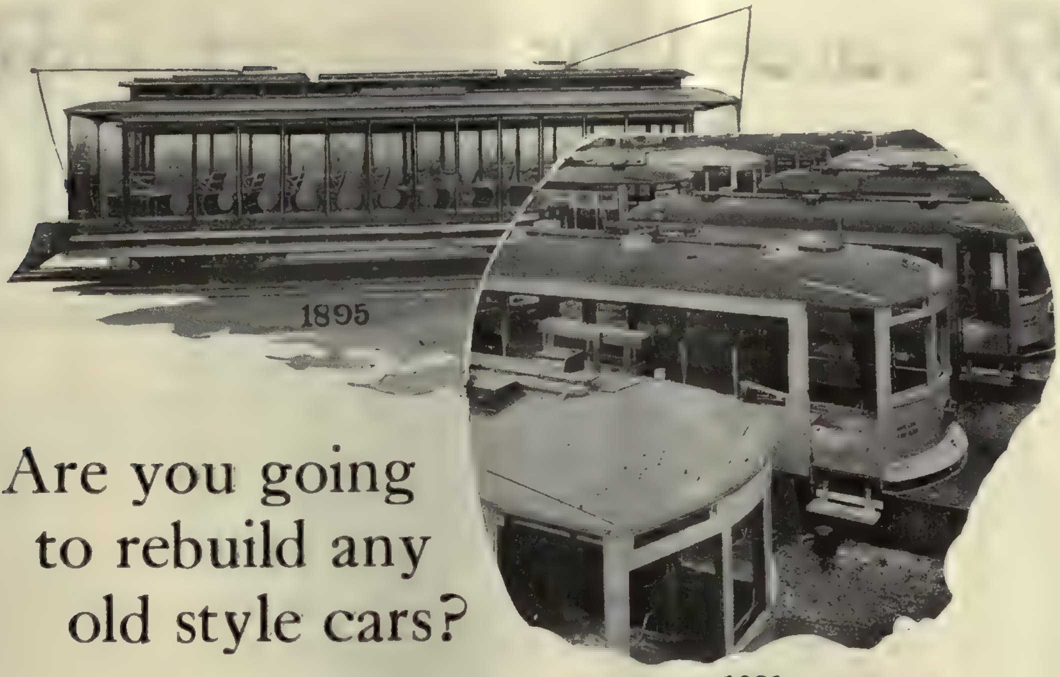
**specify**

T-741

**THE TERRY TURBINE**

Offices in Principal Cities
in U.S.A. also in Important
Industrial Foreign Countries

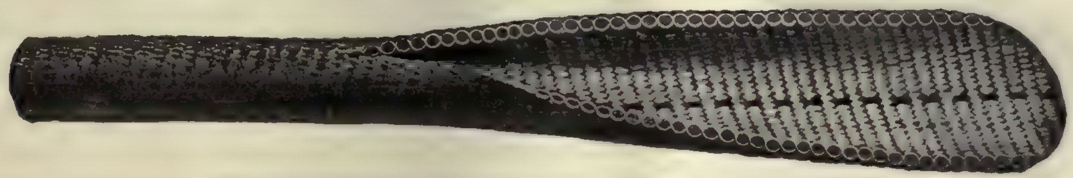
The Terry Steam Turbine Co.
Terry Sq. Hartford. Conn. U.S.A.



## Are you going to rebuild any old style cars?

## Then Save Weight by Wiring with

# DURADUCT



**The Black Dotted Line on the Interior Identifies DURADUCT**

There may be many years of useful life still left in old cars, open or closed, but they probably need extensive remodeling to make them economical to operate. Many companies are converting their rolling stock into closed cars for one-man operation. Everything is being done to make these cars as nearly up-to-date as possible, especially as regards saving weight.

Lots of new wiring is required as well as complete over-hauling of the old. Here is where Duraduct, used in place of metal conduit, saves hundreds of pounds of useless weight.

## For new cars, of course you will specify

# DURACORD

## Flexible Electric Cord

It is chosen by discriminating purchasers who keep track of real costs based on length of service.

## Tubular Woven Fabric Co., Pawtucket, R. I.

52 Vanderbilt Ave., N. Y. 549 W. Washington Blvd., Chicago

V- K

OILLESS TROLLEY WH S TROLLEY WHEEL

*The booklet "Trolley Wheels" contains a fund of vital facts on various types of More-Jones Trolley Wheels and Harps. Write today for a free copy.*

NOTHING but new metal enters into the manufacture of V-K Oilless Trolley Wheels. Not even the turnings from finishing or machining are again employed. This is one reason for the remarkable conductivity of V-K Wheels.

The *quality* of this metal, too, should be given careful consideration. It is an ideal metal for trolley wheels because it is extremely tough, yet *not too hard.* Too hard a metal grinds the wire almost like a fine emery wheel, for, once an arc occurs, it induces a series of arcs with disastrous results. The metal from which V-K Wheels are made is of such a nature that occasional arcs are *smoothed out,* thus preserving the perfect contour of the running groove.

Then there's the oilless feature of the V-K Wheel. This not only reduces lubricating costs but eliminates dripping oil as well, and reduces wear and tear on the car roof caused by shopmen's feet.

The V-K Oilless Wheel used with the V-K Non Arcing Harp makes the ideal current collector. It's a combination that will reduce operating costs on *your* property. Write today for complete data.

More-Jones Brass & Metal Co.
St. Louis, Missouri

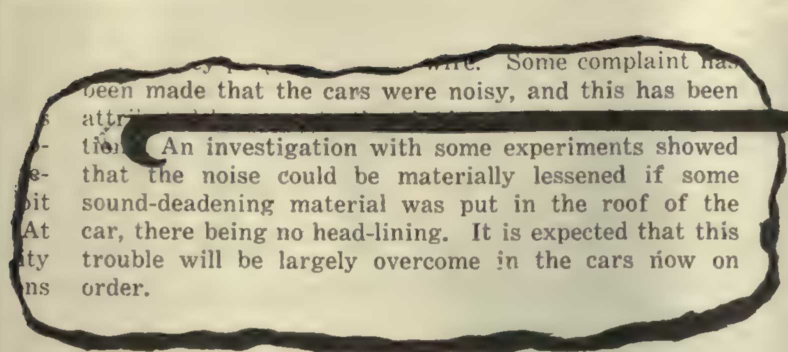
TROLLEY WHEELS:
*V-K Oilless, M. J. Lubricated*
HARPS. V-K *Non-Arcing*
BEARINGS: *"Tiger"*
*Bronze*
*Axle and Armature*
ARMATURE BABBITT
*and Similar Products*

MORE-JONES

From an article on construction of
Detroit Municipal Railway

*Electric Railway Journal*

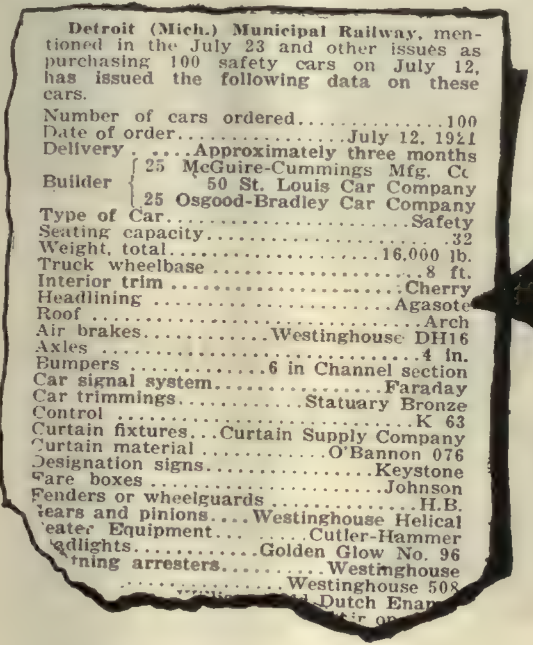
**July 30**



wire. Some complaint ha been made that the cars were noisy, and this has been attr tion. An investigation with some experiments showed that the noise could be materially lessened if some sound-deadening material was put in the roof of the car, there being no head-lining. It is expected that this trouble will be largely overcome in the cars now on order.

# Two New Items

*—they tell*
*their own story!*



**Detroit (Mich.) Municipal Railway**, mentioned in the July 23 and other issues as purchasing 100 safety cars on July 12, has issued the following data on these cars.

| | |
|---|---|
| Number of cars ordered | 100 |
| Date of order | July 12, 1921 |
| Delivery | Approximately three months |
| Builder | 25 McGuire-Cummings Mfg. C<br>50 St. Louis Car Company<br>25 Osgood-Bradley Car Company |
| Type of Car | Safety |
| Seating capacity | 32 |
| Weight, total | 16,000 lb. |
| Truck wheelbase | 8 ft. |
| Interior trim | Cherry |
| Headlining | Agasote |
| Roof | Arch |
| Air brakes | Westinghouse DH16 |
| Axles | 4 in. |
| Bumpers | 6 in Channel section |
| Car signal system | Faraday |
| Car trimmings | Statuary Bronze |
| Control | K 63 |
| Curtain fixtures | Curtain Supply Company |
| Curtain material | O'Bannon 076 |
| Designation signs | Keystone |
| Fare boxes | Johnson |
| Fenders or wheelguards | H.B. |
| ears and pinions | Westinghouse Helical |
| eater Equipment | Cutler-Hammer |
| adlights | Golden Glow No. 96 |
| tning arresters | Westinghouse |
| | Westinghouse 508 |
| | Dutch Ena |

*News item—*

**Aug. 6**

*Specify—*

# AGASOTE

(TRADE MARK)

For headlinings, roofing and wainscoting in your cars

# PANTASOTE

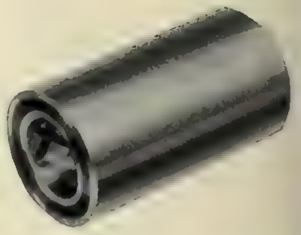
(TRADE MARK)

For your car curtains and upholstery

## THE PANTASOTE COMPANY

11 Broadway, New York
Peoples Gas Bldg., Chicago, Ill.
751 Monadnock Bldg., San Francisco, Cal.

*Two-thirds of America's electric railway systems are now using Bound Brook Oil-less Trolley Wheel Bushings.*



# Protect Your Trolley Wheels

REGARDLESS of gruelling strain and running conditions, trolley wheels must perform without constant attention. Yet the factor of proper lubrication can't safely be overlooked.

Thin, loose lubrication brings about continual clattering. Haphazard oiling causes gummy harps and skidding wheels. Such conditions bring quick destruction to wheel and wire both.

By their ability to run smoothly in spite of strain and neglect, Bound Brook Oil-less Trolley Wheel Bushings afford dependable protection.

Specially compounded graphite, packed firmly in the grooved core, provides lasting lubrication. That does away with bushing inspection besides insuring longer wear to wheels and trolley wire.

Bound Brook Bushings are packed fifty to the box. The standard green labeled container is your protection against substitution.

**Bound Brook Oil-less Bearing Co.**

*Specialists in the manufacture of Oil-less Bushings for more than a third of a century*

Detroit Office: 1723 Ford Bldg.

Bound Brook New Jersey

BOUND BROOK

OIL-LESS TROLLEY WHEEL BUSHINGS

# "STANDARD"

Steel Tires

Steel Tired Wheels

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

S BRAND

*"The 'Standard' Brand on your material is an assurance of eventual economy."*

S BRAND

## STANDARD STEEL WORKS CO.

GENERAL OFFICES

500 NORTH BROAD ST., PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA
ST. PAUL

RICHMOND
SAN FRANCISCO
NEW YORK
HOUSTON

MONTEREY, MEX.
MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

A perfect Wood Strain Insulator —a perfect Crossover— both made by

Double Take-Up Wood Strain Insulator

Anderson Crossovers

ANDERSON

In the adjustment of the Anderson Double Take-Up Wood Strain Insulator, the time and labor are halved. The slack adjusted in half the time and no twisted guy wires. The great tensile strength, perfect adjustment, and good insulation make it a perfect strain insulator.

Anderson Crossovers are typical of the whole Anderson Line. They mean economy and service to you.

These crossovers are scientifically designed to insure long wear of both crossing and wire, at the point where the strain on both is greatest.

*Let us send you Catalogue 8, telling about these in detail.*

ALBERT & J. M. ANDERSON MANUFACTURING CO.
289-293 A Street, Boston, Mass., U. S. A.

NEW YORK
135 Broadway

PHILADELPHIA: 429 Real Estate Trust Bldg.
LONDON, E. C.: 48 Milton St.

CHICAGO
105 S. Dearborn St.

Order By Name

See that "White" is on the end of every porcelain insulator you buy.

"White" reputation has encouraged substitution. You can't risk having a brittle, porous, unreliable insulator that has no mechanical or dielectric strength, worked off on you.

"White" quality goes with the name on the end.

Safeguard line interests by refusing any other "just as good" insulator.

T. C. WHITE ELECTRICAL SUPPLY CO.
1122 PINE STREET, ST. LOUIS, MO.

# Rolled and Forged Circular Sections

GEARS and other uniform circular sections, such as automobile flywheels, industrial wheels, etc., made from blanks, produced by our combined rolling and hydraulic forging process, stand up under the most severe operating conditions and are economical to buy and use. That is why they appeal to the operating man.

These blanks appeal to the manufacturer because they are free from blow holes, shrinkage cavities and strains; scrap losses are eliminated; the steel is unusually thoroughly worked; blanks are stronger and more easily machined. There are many other reasons as well.

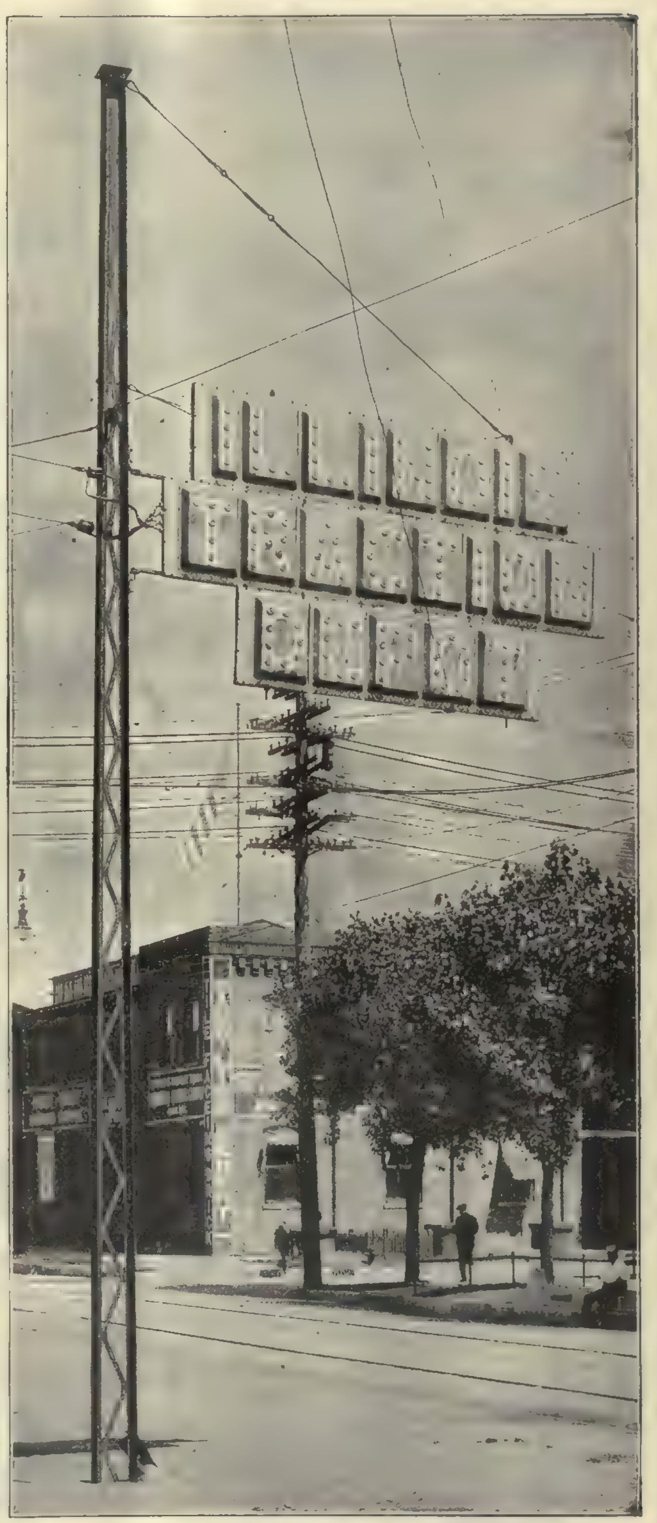
*It will pay you to investigate.*

**Midvale Steel and Ordnance Company**
**Cambria Steel Company**

**General Sales Office: Widener Building**
**Philadelphia, Pa.**

**District Sales Offices:**
Atlanta Boston Chicago Cincinnati Cleveland Detroit
New York Philadelphia Pittsburgh San Francisco
Salt Lake City Seattle St. Louis
Washington, D. C.

SOLE EXPORTER OF OUR COMMERCIAL PRODUCTS CONSTECO CONSOLIDATED STEEL CORPORATION 165 BROADWAY NEW YORK, U.S.A.



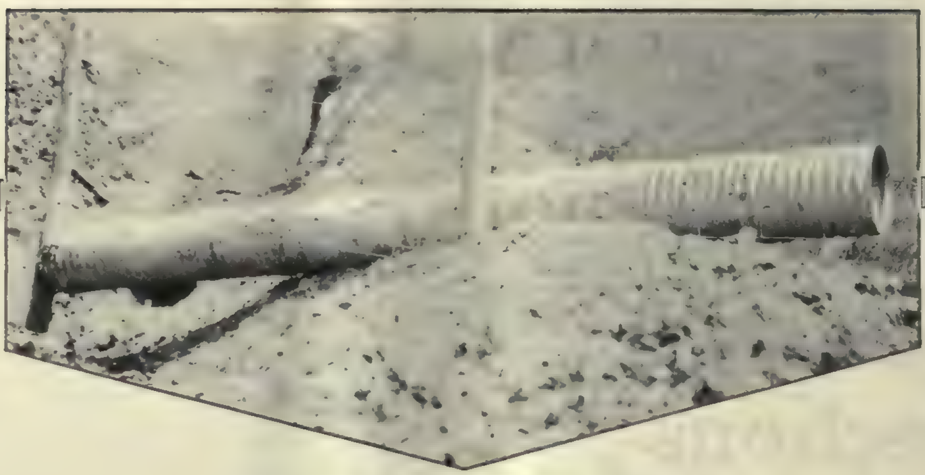
## Bates One-piece Poles Are Artistic

Perhaps Art is a secondary consideration when you plan your pole line construction, but it cannot be disregarded—especially when these poles are to be installed in exclusive residential districts or on your business blocks.

The combination of great utility and art with the lowest first cost makes the Bates Poles desirable for all types of pole line construction.

**Our New 1921 TREATISE AND HANDBOOK sent upon request.**

**Bates Expanded Steel Truss Co.** 208 South La Salle Street
CHICAGO, ILLINOIS



## "ACME" (NESTABLE) <TONCAN> CORRUGATED METAL CULVERTS

## —removed after 11 years—hardly affected

In 1908 a 15-inch IMPERIAL Riveted Corrugated Culvert was installed under the White Bear Lake and Phalen road in Ramsey County, Minn.

When removed in 1919 to make way for a larger culvert, it was found to be in perfectly serviceable condition. The above (unretouched) view was taken of this culvert right after its removal. You will notice that eleven years of continuous use had practically no effect on it.

Its fine condition indicates that it would have lasted for many more years.

Everywhere IMPERIAL Corrugated Culverts are giving unusually long service. The reason? They are made of anti-corrosive Toncan Metal—it endures! IMPERIALS are furnished in all the standard diameters. Prompt shipment can be made. We also make "ACME" (Nestable) Corrugated Culverts of Toncan Metal. Write for delivered prices.

THE CANTON CULVERT & SILO CO.
MANUFACTURERS
CANTON, OHIO, U.S.A.

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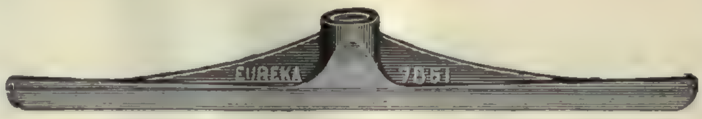
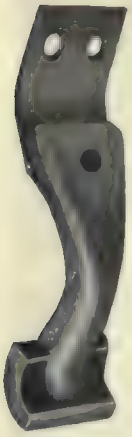


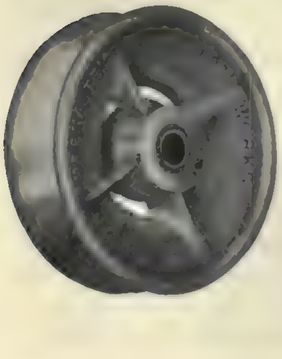


# Eureka Equipment

Eureka Equipment will help to keep down maintenance costs because it is correctly designed and carefully manufactured from our own special alloys.

*We can now make prompt shipments on*

**Commutators**
**Trolley Wheels**
**Trolley Ears**
**Brush Holders**
**Sleet Trolley Wheels**
**Line Material**
**Controller Fingers**
**Bearings**



*Write for catalog*

## The Eureka Company

**Northeast, Pennsylvania**
**120 Broadway, New York**

# No Loss of Time If Your Cars Have Bayonet Equipment

Harp or wheel changed in ten seconds, or a pole in less than a minute. No tools — only your hands. All lubricating, adjusting and repairing done at the work bench. No delays to car schedules. That is why *all large users* of One-Man Cars use the Bayonet. It is not only a great time saver, but it is unsurpassed for efficiency and economy. Try it for 60 days. You must be satisfied or the equipment is ours. Get ready for heavy traffic.

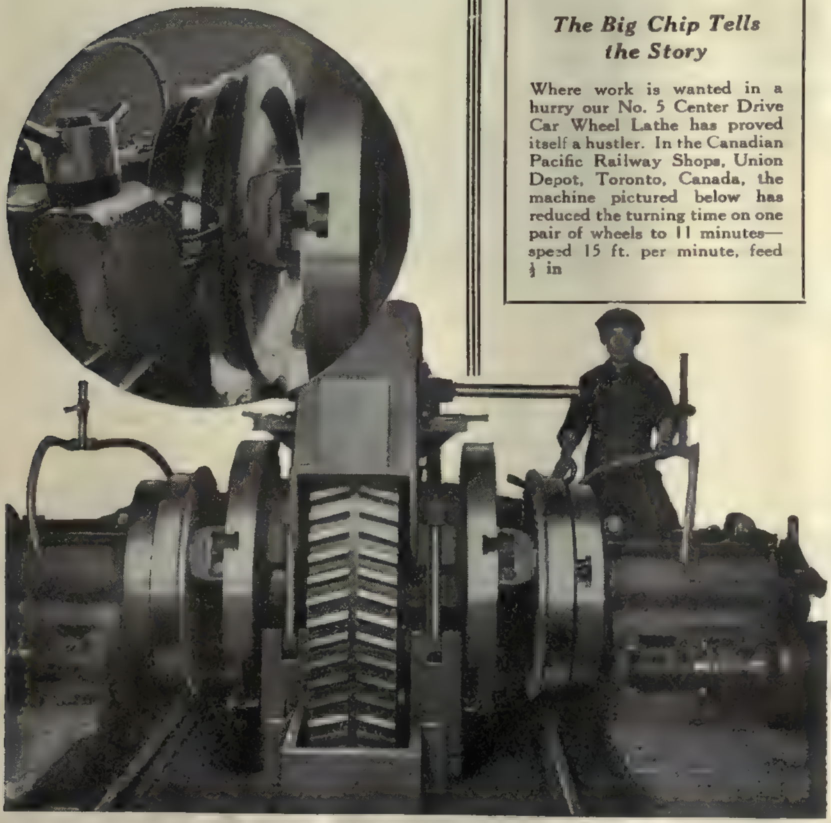
**Bayonet Trolley Harp Co.**
**Springfield, Ohio**

---

## Turning a Pair of Car Wheels in 11 Minutes

***The Big Chip Tells the Story***

Where work is wanted in a hurry our No. 5 Center Drive Car Wheel Lathe has proved itself a hustler. In the Canadian Pacific Railway Shops, Union Depot, Toronto, Canada, the machine pictured below has reduced the turning time on one pair of wheels to 11 minutes—speed 15 ft. per minute, feed ⅓ in



THE high production of which this machine is capable is largely due to the center driving construction with powerful herringbone gear having automatic quick-acting hinged segment to admit the axles.

Additional time and labor saving features include semi-automatic drivers, pneumatic tool clamps, pneumatically operated tailstocks, push button motor control.

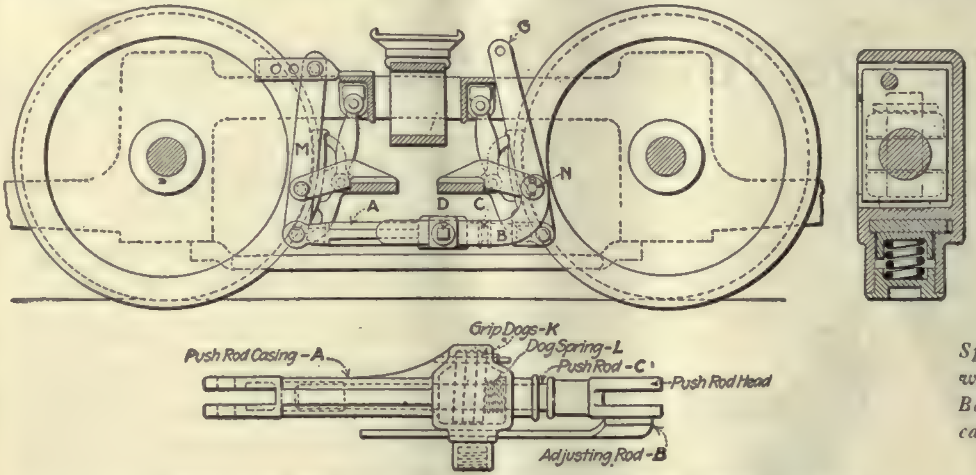
### N-B-P Center Drive Car Wheel Lathe

We are in a position to furnish complete machine tool equipment for electric railway repair shops, including car wheel lathes, wheel presses, axle lathes, car wheel borers, etc., as well as steam forge hammers, engine lathes, boring and turning mills, etc., and the electric travelling cranes to serve them.

**NILES-BEMENT-POND CO.**
**111 BROADWAY NEW YORK**

*Brake-Rigging Continuously Taut with—*

GOULD
Slack
Adjuster



Details of the Gould Type Slack Adjuster as applied to an Electric Car Truck

*Specified by United Railways & Electric Co., of Baltimore, for latest safety cars.*

How often you notice a motorman running with brakes partially set up, due to over-anxiety to be sure that all the slack is out of rigging. The waste of power and wear on brake shoes in such cases is appalling.

Remove the incentive to run with brakes set up, by installing Gould Automatic Slack Adjusters, which keep the brakes always ready for instant response to the operator's effort. Incidentally you will save materially on shop expense, which occurs from the necessity of frequent manual adjustments of brake rigging when it is not taken care of by Gould automatic adjusters.

***Write today for further information***

**GOULD COUPLER COMPANY**

**30 East 42nd St., New York City** **Works: Depew, N. Y.** **The Rookery, Chicago, Ill.**

CHILLINGWORTH
ONE PIECE

Seamless Drawn Steel Gear Case is well adapted to the requirements peculiar to Safety Car Motors, as to

**Low first cost**
**Light weight—50 lbs.**
**Minimum maintenance charges**
**Maximum economy**

***Strength has not been sacrificed for lightness.***

INVESTIGATE

You will learn that hundreds of new safety cars are equipped with Chillingworth cases.

**Chillingworth Mfg. Co.**
**Jersey City, N. J.**

# Carnegie Wrought Steel Wheels

## *for Durability*

Carnegie Steel Company has had long experience in the manufacture of rails, cross ties, rail joints, etc., for track maintenance—also in the manufacture of shapes, plates, bars, wheels and axles for rolling stock.

In the manufacture of Carnegie Steel Wheels the steel is first thoroughly worked and rolled. This insures a homogeneous structure — the same throughout — a structure suited to long endurance by its adaptability to successive reductions in the process of machining without loss in resistance to wear. A solid steel wheel can be worn to the limit.

The length of service of a wheel cannot be stated exactly, due, of course, to variations in loads, speeds, types of brakes, track conditions, etc. In general, a Carnegie Steel Wheel under passenger cars should run 300,000 miles; under freight cars, 240,000 miles; and under electric cars, 200,000 miles. These figures have been greatly exceeded in many cases.

**For durability, specify Carnegie Steel Wheels**

**Carnegie Steel Company**
General Offices: Carnegie Building, Pittsburgh, Pa.

1459

---

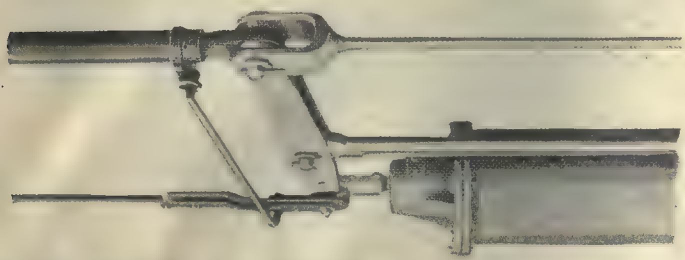
## —introducing to America

# DURSON

## the Proven Successful Brake Regulator

The Durson Brake Regulator has been in successful service on European Railroads and street railways for several years. It is an established improvement in slack-adjusting mechanism—not an experiment or innovation.

The Durson Brake Regulator does more than any slack adjuster. *It provides a fixed minimum brake shoe clearance.* Also the piston stroke is maintained practically constant.

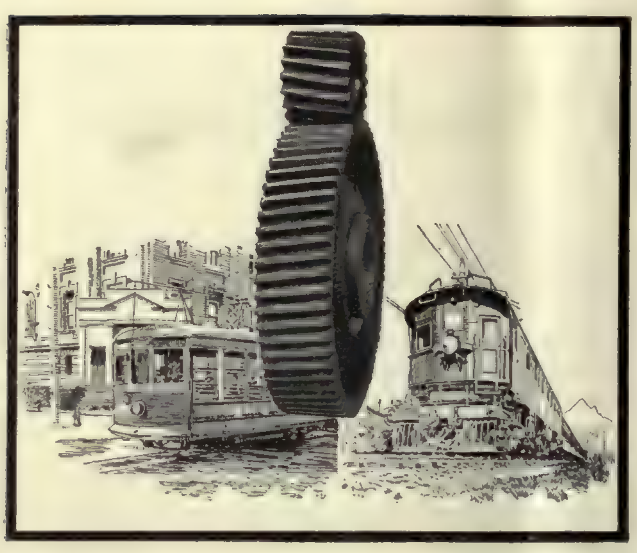


These two most desirable results are not secured by any other slack adjuster. The Durson equipment accomplishes this by eliminating all variations in brake-shoe clearances resulting from the deflection in the brake rigging and the lost motion in the journal boxes.

Can be adapted to any type of car.

***Send for full details.***

**HAMILTON & HANSELL, Inc.**
**13 Park Row New York, N. Y.**



## Nuttall Helical Gears

The worm-action operating tendency of Nuttall Gears in which the teeth are eased into and out of mesh, thereby decreasing tooth deflection and resultant vibration — **logically decreases noise and vibration.**

**R.D.NUTTALL COMPANY**
**PITTSBURGH PENNSYLVANIA**

All Westinghouse Electric and Mfg. Co. District Offics are Sales Representatives in the United States for Nuttal Electric Railway and Mine Haulage Products.

N-2569

# Nuttall

## *Made-over Cars are Make-shift Cars*

The old-fashioned slow-starting heavy car was all right in its day, but that day is gone. Trying to make a one-man safety car out of it now is like trying to use an old Corliss steam engine to drive an aeroplane. It's better not to try it.

The only way to put the one-man car idea across—to please your public and your employees and to secure the full economies of it—is to purchase new, modern real Safety Cars.

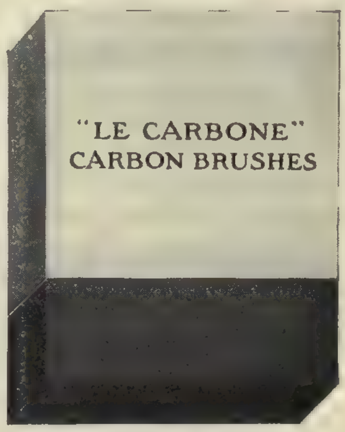
***Standardize on St. Louis Quality Safeties***

*St Louis Car Company*
*St. Louis, Mo.*
*"The Birthplace of the Safety Car."*

"Tool Steel" gears
In severest test,
For thirteen years
Have proven best.

DAVIS
Steel Wheel

**American Steel Foundries**
NEW YORK CHICAGO ST. LOUIS



**They are uniform in quality**

*They talk for themselves*

**W. J. Jeandron**
227 Fulton Street
New York City

Pittsburgh Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

TRUCK WITH TOWER IN RUNNING POSITION

This 3-Section

**TRENTON TOWER**

is not only more convenient, but stronger than the older type.

The top section is reinforced by the intermediate section. The 3-section design makes it possible to raise the platform 16 inches higher and drop it 12 inches lower than can be done with the old-style 2-section tower.

We'll gladly send you details.

**J. R. McCARDELL CO.**
Trenton, New Jersey, U. S. A.

Ten Days Afterward
It Was Ringing the Warning

As the result of an accident at a crossing a Nachod Highway Crossing Signal was recommended to be installed. Ten days later the signal was in operation. Prompt service like this is appreciated. Let us safeguard your dangerous crossings.

**NACHOD SIGNALS**

for highway crossings give arrestive warnings, work reliably and need but little care. The motorman "sees" the bell ring by observing a flashing pilot light before he reaches the crossing. Catalog 720 tells the story. Nachod Block Signals and Headway Recorders are among our other products.

NACHOD SIGNAL CO., INC.
LOUISVILLE, KENTUCKY

Peirce Forged Steel Pins
with Drawn Separable Thimbles
Your best insurance against insulator breakage
Hubbard & Company
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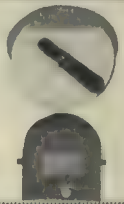

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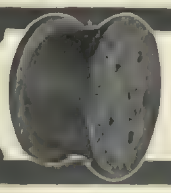

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WESTERN SALES REPRESENTATIVES: STEEL SALES CORPORATION, CHICAGO, ILL.
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**Est. 1848—Inc. 1870**

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It will interest you to know that we can ship ties, treated or untreated, immediately from stock in our yards.

*We carry all kinds and grades.*

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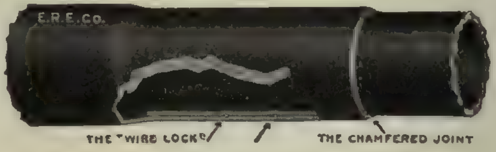

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**Lowest Cost** **Lightest Weight**
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Protection at intersections with wyes
Proceed signals in street reconstruction work

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*We Specialize in Trackmower Equipment Only*

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for heavy street railway work are the best obtainable. Write for New Complete Catalogue.

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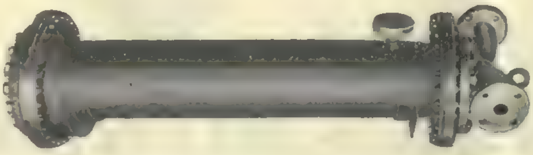

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They are well known in the Railway Shops because of their durability, high resistivity and low cost.

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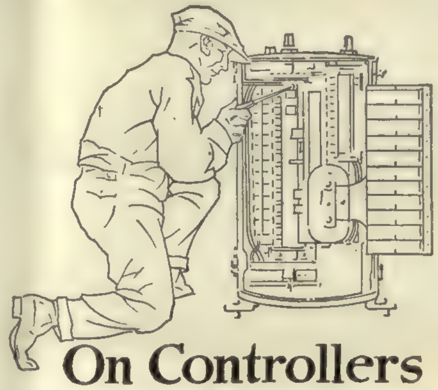

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Seven sizes, 6 to 21 inches.

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can invariably be filled by a friend.

The Searchlight Section

of this issue covers the current business wants of the industries in which this paper is read.

For Every Business Want—
*"Think* SEARCHLIGHT *First"*

0134

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must be satisfied by someone in your industry.

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**THE CLEVELAND**
accommodates both
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GOLD CAR HEATING & LIGHTING CO.
NEW YORK CITY
PATENTED

THERMOSTAT CONTROL EQUIPMENTS

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is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. **Write for details.**

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Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

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Accurate Registration

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International Registers are made in single and double types for a wide variety of uses. Send for our catalogue.

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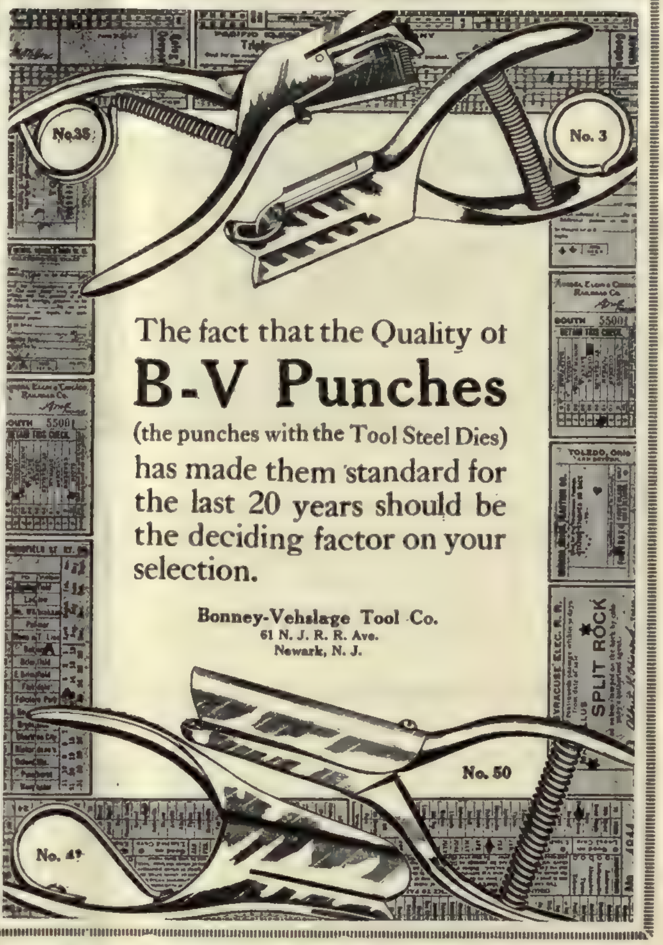

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(the punches with the Tool Steel Dies) has made them standard for the last 20 years should be the deciding factor on your selection.

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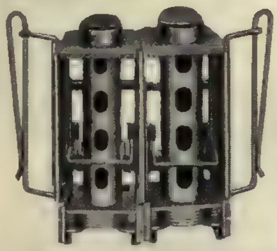

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Each barrel a separate unit, permitting the conductor to interchange the barrels, to suit his personal requirements and to facilitate the addition of extra barrels.

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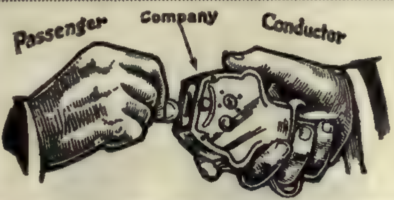

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Use them in your terminals—
PEREY TURNSTILES or PASSIMETERS

*Faster than the ticket seller*

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Metal Mouldings & Shapes

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THERE is a special type of EARLL Trolley Catcher or Retriever for every type of service. Our business is making retrievers and catchers—nothing else. We have specialized in this particular field for your benefit. Consult us.

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Trade Mark Reg. U. S. Pat. Off.
Made of extra quality stock firmly braided and smoothly finished.
Carefully inspected and guaranteed free from flaws.
Samples and information gladly sent.

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The new 1921 model —without rivets—ready for delivery

Supplied in one or four tube combinations

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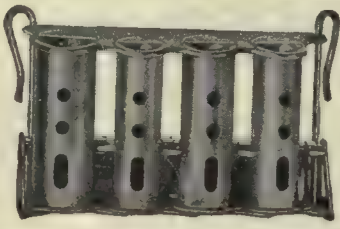
Exclusive Manufacturers' Selling Agent



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Its use insures continuous operation, greater mileage and lower maintenance costs.

Every U. S. G. Brush is absolutely uniform, self-lubricating and non-abrasive—This we guarantee.

*The services of our engineers are at your disposal.*

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Branch Offices: New York, Chicago, Philadelphia, St. Louis, Pittsburgh, Denver, Minneapolis, San Francisco
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STANDARD for a THIRD of a CENTURY

The Mileage Babbitt

Post's ZERO and MOTOR metals have been standard for a third of a century in shops where mileage records are attained. Nothing but highest grade of virgin raw materials used.

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Manufacturers of
COIL AND ELLIPTIC
SPRINGS
FOR
RAILWAY SERVICE

ELECTRIC RAILWAY JOURNAL

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POSITIONS VACANT

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POSITIONS WANTED

## POSITIONS VACANT

SUPERINTENDENT of transportation wanted, for electric street railway in Middle Western City operating twenty cars. Must be capable of dealing tactfully with obstinate labor situation. Reply, stating age, experience, references, and salary expected. P-927, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

WANTED—An accountant who is entirely familiar with street railroad accounting and revaluation of electric railways. Take entire charge of the office of our client, a Southern street railroad of approximately $900,000 receipts. Title would be Vice-President and Auditor. Initial salary approximately $4,000. Submit qualifications to Haskins & Sells, certified public accountants, Harris Trust Bldg., Chicago, Ill.

WANTED—Car barn foreman familiar with the G. E. motors and Westinghouse air brake equipment; location central New York. P-931, Elec. Ry. Journal.

## POSITIONS WANTED

ELECTRICAL engineer enjoying pleasant relations on the engineering staff of an electric railway apparatus maufacturer desires, for personal reasons, to connect as master mechanic, superintendent of equipment or overhead, electrical superintendent, or local or district superintendent for a railway, power or combined utility, preferably Middle West; in service since 1903; available 30 days; minimum salary $3,000. PW-930, Elec. Ry. Journal, Real Estate Trust Bldg., Phila.

COMPETENT operating official desires interview with owners of any property seeking new manager; twenty years experience in city and interurban service; familiar with valuation and rate cases. PW-929, Elec. Rail. Journ.

MASTER mechanic, thoroughly experienced and efficient on maintenance and operation of city and interurban cars, shops and barns, seeks opportunity to change. PW-928, Elec. Ry. Journal, Old Colony Bldg., Chicago.

POSITION wanted in any one or a combination of the following allied power or railway activities: Purchasing agent, electrical superintendent, superintendent of construction, superintendent of distribution and operation, superintendent of rolling stock, superintendent of equipment, district superintendent. Technical graduate, eleven years' experience. Now

SUPERINTENDENT of substation desires a change; nearly 12 years' experience on large city interurban properties with a proven record; would consider maintenance only. PW-932, Elec. Ry. Journal, Old Colony Bldg., Chicago.

## BOOKS & PERIODICALS

**Magazines Wanted**

Back numbers of Electric Railway Journal wanted from 1910 to date. The H. W. Wilson Co., 964 University Ave., New York, N. Y.

**For 20 Years**

we have been

Buying and Selling

**Second-Hand Cars**

Trucks and Motors

At Your Service

**ELECTRIC EQUIPMENT CO.**

Commonwealth Bldg., Philadelphia, Pa

FOR SALE

**Contractors' Hoisting Engine**

Double Drum, two cylinders 5¼ in. x 7 in. Fine running order. Price $600.

**JOHNSON BROS.**

Brocton, N. Y.

## Notice to Advertisers

Owing to the holiday—Labor Day, Monday, September 5th—the "*Searchlight*" pages of the September 3rd issue of the *Electric Railway Journal* will close for press a day earlier than usual.

**CHANGES OF COPY**

and new advertisements for the September 3rd issue should reach us on or before

**10 A. M., TUESDAY AUGUST 30TH**

OFFER FOR IMMEDIATE SHIPMENT

**500-KW. MOTOR GENERATOR SET**

1—500 kw. Westinghouse 550 volt, 833 amp., 514 r.p.m. compound wound dynamo direct connected to—

1—720 hp. Westinghouse 3 phase, 60 cycle, 2300 volt, synchronous motor. Outfit self contained, and complete with starting equipment for A.C. and D.C. ends.

**ARCHER & BALDWIN, INC.**

Tel. 4337-8 Rector 114-118 Liberty St.

**"Opportunity" Advertising:**

**Think "SEARCHLIGHT" First!**

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MECH. 57

SEAT 57 S.C.

SEAT 327 S.B.

# NEW CAR SEATS

with HEYWOOD-WAKEFIELD guarantee

## 20% off Manufacturer's Price

| Sale Price | Mfr's Price | |
|---|---|---|
| $10.80 | $13.50 | Mechanism only. |
| $25.60 | $32.00 | Mechanism with Rattan Seat and Back |
| $20.00 | $25.00 | Mechanism with Slat Seat and Back. |

Length overall 31¼ in.—29 in. cushion.
Back Offset—Aisle 2¼ in.—Wall 1¼ in.

***Available for SAFETY or other type cars***

**These seats are NEW and in original package at factory. Prices quoted F.O.B. Wakefield, Mass., and carry MANUFACTURER'S GUARANTEE**

***Reclamation Department***

**EASTERN MASSACHUSETTS STREET RAILWAY CO.**
**1 Beacon Street, Boston, Mass.**

# Service Value

*Scrap value* for idle used machinery or surplus material is not enough. If it can be used by others they will pay *service value* for it. "Searchlight" will find these buyers for you.

Manufacturers who accept used machinery in part payment for new can dispose of it promptly by advertising in the Searchlight Section.

Machinery used in manufacturing and displaced by other equipment can be sold at a fair price by advertising it in the Searchlight Section.

Wide-awake dealers, agents or representatives can be secured through little Searchlight "Want" ads.

Manufacturing sites, partners, help, capital —anything that anybody in the machinery field is likely to have for sale or exchange for something else—can be located or disposed of through the Searchlight Section.

The cost of putting your Wants in this projector is very slight, whether for a man, for a job or for a market.

## Searchlight Section

# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Purifiers**
Horne Mfg. Co.

**Air Receivers**
Western Elec. Co.

**Anchors, Guy**
Electric Service Supplies Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Automobiles and Buses**
Brill Co., The J. G.

**Axles**
Bemis Car Truck Co.
Cambria Steel Co.
Midvale Steel & Ordnance Co.
St. Louis Car Co.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

**Babbitt Metal**
Ajax Metal Co.
More-Jones Brass & Metal Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.
Western Elec. Co.

**Badges and Buttons**
American Railway Supply Co.
Electric Service Supplies Co.
International Register Co., The
Western Elec. Co.

**Batteries, Dry**
National Carbon Co. Inc.
Western Elec. Co.

**Bearings and Bearing Metals**
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
Post & Co., Inc., E. L.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.
Western Elec. Co.

**Benders, Rail**
Niles-Bement-Pond Co.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
Cambria Steel Co.
Midvale Steel & Ordnance Co.

**Bond Testers**
American Steel & Wire Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail**
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Western Elec. Co.

**Brake Adjusters**
Gould Coupler Co.
Hamilton & Hansell, Inc.
National Ry. Appliance Co.
Smith-Ward Brake Co.
Westinghouse Traction Brake Co.

**Brake Regulator**
Hamilton & Hansell, Inc.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.
Western Elec. Co.

**Brooms, Track, Steel or Rattan**
American Rattan & Reed Mfg. Co.
Western Elec. Co.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
National Carbon Co. Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

**Brushes, Graphite**
National Carbon Co., Inc.
United States Graphite Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

**Bus Motor**
Trackless Trans. Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., J. G.

**Bushings, Graphite and Wooden**
Bound Brook Oilless Bearing Co.

**Cables. (See Wires and Cables)**

**Cambric, Yellow & Black Varnished**
American Di-Electric, Ltd.
Irvington Varnish & Insulator Co.

**Cambric Tapes, Yellow & Black Varnished**
American Di-Electric, Ltd.
Irvington Varnish & Insulator Co.

**Carbon Brushes. (See Brushes, Carbon)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars**
Cambria Steel Co.
Midvale Steel & Ordnance Co.

**Cars, Dump**
Differential Steel Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
Midvale Steel & Ordnance Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
General Electric Co.

**Castings, Brass, Composition or Copper**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
Ajax Metal Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Earll, Chas. I.
Electric Service Supplies Co.
Ohio Brass Co.
Trolley Supply Co.
Wood Co., Chas. N.

**Ceiling, Car**
Pantasote Co.

**Change Carriers**
Galef, J. L.

**Checks, Employees**
American Railway Supply Co.

**Circuit Breakers**
Automatic Reclosing Circuit Breaker Co.
Condit Elec'l Mfg. Co.
Cutter Elec. Mfg. Co.
Don-O-Lac Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.

**Cleats**
Western Elec. Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling. (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & Mfg. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Coin-Counting Machines**
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Cleveland Armature Works
Columbia M. W. & M. I. Co.
Don-O-Lac Co.
Eureka Co.
General Electric Co.
Mica Insulator Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
General Electric Co.
Westinghouse Trac. Brake Co.

**Concrete Products**
Massey Concrete Products Co.

**Concrete Reinforcing Bars**
Cambria Steel Co.
Midvale Steel & Ordnance Co

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co

**Condensor Papers**
Irvington Varnish & Insulator Co.

**Conduits, Flexible**
Tubular Woven Fabric Co.

**Conduits, Interior**
Western Elec. Co.

**Connectors, Solderless**
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

**Controllers or Parts**
Columbia M. W. & M. I. Co.
Don-O-Lac Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Elec. Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Conveying and Hoisting Machinery**
Columbia M. W. & M. I. Co.

**Copper Wire**
Anaconda Copper Mining Co.
Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.
Trolley Supply Co.

**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
American Steel Foundries
Brill Co., The J. G.
Gould Coupler Co.
Ohio Brass Co.
Westinghouse Trac. Brake Co.
Van Dorn Coupler Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Cross Arms. (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals. (See Signals, Crossing)**

**Crossings, Frog & Switch**
Wharton, Jr., & Co., Wm.

**Crossings, Track. (See Track, Special Work)**

**Culvert Pipe, Concrete**
Massey Concrete Products Co.

**Culverts**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
Pantasote Co.
St. Louis Car Co.

**Dealer's Machinery**
Archer & Baldwin
Cleveland Armature Works
Electric Equipment Co.
Foster Co., H. M.

**Derailing Devices. (See also Track Work)**
Wharton, Jr. & Co., Wm.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.
Safety Car Devices Co.

## Don't Overlook Opportunities

Men who regularly keep in touch with the market through other channels often overlook the many opportunities that are to be found in the

**SEARCHLIGHT SECTION**

For Every Business Want
*"Think* SEARCHLIGHT *First"*

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## The Sense of Security

Which comes to the motorman with the knowledge backed up by experience, that his brakes are always adjusted to a nicety, occurs when equipment includes

# SMITH-WARD

## Brake Slack Adjusters

Built to suit the requirements of electric railway service. We will gladly send you details of the application of Smith-Ward Slack Adjusters to your rolling stock if you advise us of the type of cars and trucks you have.

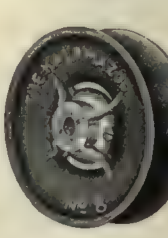
Especially desirable for safety cars, where successful service is so dependent on quick and accurate stops.

**Smith-Ward Brake Co.**
**233 Thirty-seventh St., Brooklyn, N. Y.**

## The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

**THE STAR BRASS WORKS**
**KALAMAZOO, MICH., U. S. A.**



B. A Hegeman, Jr., President
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Harold A. Hegeman, Vice Pres. and Treas. Fred C. J. Dell, Secretary

## National Railway Appliance Co.

**50 East 42nd St., New York City**

Hegeman-Castle Corporation
343 So. Dearborn St., Chicago, Ill.

National Railway Appliance Co.
Munsey Bldg., Washington, D. C.

National Railway Appliance Co.
Little Bldg., Boston, Mass.

## RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anderson Slack Adjusters
Genesco Paint Oils
Dunham Hopper Door Device
Feasible Drop Brake Staffs
Flaxlinum Insulation
Anglo-American Varnishes, Paints, Enamels, Surfacers, Shop Cleaner
Johnson Fare Boxes
Drew Line Material and Railway Specialties
Perry Side Bearings
Hartman Centering Center Plates
Economy Power Saving Meter
H & W Electric Heaters
Garland Ventilators
Pitt Sanders
National Safety Car Equipment Co's One-Man Safety Cars

# HASKELITE

*The Plywood made with waterproof glue*

An Engineering Material
used by car builders

*for*

Roofs
Headlining
Side Panels
Ceilings
Bottoms and Backs of Seats

*Write for Samples and Prices*

**HASKELITE MANUFACTURING CORP.**
133 W. Washington St., Chicago, Illinois

**"Reproduction of Ajax Car Brass that ran 336,000 miles before wearing too thin for further use"**

***This Car Brass was sent to us by a large Electric Railway System***

We do not guarantee all our Car Brasses to wear as long—but this Time Record points to why, after thirty years' experience, Ajax Metals stand at the top.
Ajax Car Brasses, Check Plates and Babbitt Metals help to increase your dividends.
They are metals that give good service.

**THE AJAX METAL COMPANY**
*Established 1880*

Main Office and Works:
PHILADELPHIA, PA.

Southern Plant:
BIRMINGHAM, ALA.

# WHAT AND WHERE TO BUY

**Doors and Door Fixtures**
Brill Co., The J. G.
Dahlstrom Metallic Door Co.
General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging. (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.
Zelnicker Supply Co., Inc. Walter A.

**Electric Specialties**
National Electric Specialty Co.

**Electrical Wires and Cables**
American Electrical Works
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. S.
Archbold-Brady Co.
Arnold Co., The
Beeler, John A.
Byllesby & Co., H. M.
Clark Management Corp., E. W.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelly Cooke & Co.
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J.G.

**Engines, Gas, Oil or Steam**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**
Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
National Railway Appliance Co.

**Feed Water Heaters**
Schutte & Koerting Co.

**Fence**
Cambria Steel Co.
Midvale Steel & Ordnance Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.
Western Elec. Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works

**Fibre and Fibre Tubing**
Continental Fibre Co.
Westinghouse Elec. & Mfg. Co.

**Field Coils (See Coils).**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Flaxlinum Insulation**
National Railway Appliance Co.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.
Western Elec. Co.

**Floor Plates**
American Abrasive Metals Co.

**Forgings**
Cambria Steel Co.
Carnegie Steel Co.
Columbia M. W. & M. I. Co.
Eureka Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track. (See Track Work)**

**Funnel Castings**
Wharton, Jr., Inc., & Co., Wm.

**Fuse Mounts**
National Electric Specialty Co.

**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

**Fuses, Refillable**
Columbia M. W. & M. I. Co.
General Electric Co.

**Gaskets**
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas-Electric Cars**
General Electric Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Cambria Steel Co.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.
Standard Steel Works Co.

**Gear Cases**
Chillingworth Mfg. Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Gong (See Bells and Gongs)**

**Greases. (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.
Western Elec. Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Hacksaws**
Gladium Co., Inc.

**Harps, Trolley**
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works
Western Elec. Co.

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
Trolley Supply Co.

**Headlining**
Haskelite Mfg. Co.
Pantasote Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford Chain Block Co.
Niles-Bement-Pond Co.

**Hose, Bridges**
Ohio Brass Co.

**Houses, Station, Watchmen's, Concrete**
Massey Concrete Products Corp.

**Hydraulic Machinery**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Injectors**
Schutte & Koerting Co.

**Instruments, Measuring, Testing and Recording**
Economy Electric Devices Co.
General Electric Co.
Thompson-Levering Co.
Western Elec. Co.
Westinghouse Elec. & Mfg. Co.

**Insulating Cloth, Paper and Tape**
American Di-Electric, Ltd.
General Electric Co.
Irvington Varnish & Insulator Co.
Mica Insulator Co.
Sherwin-Williams Co.
Westinghouse Elec. & Mfg. Co.

**Insulating Silk**
Irvington Varnish & Insulator Co.

**Insulating Varnishes**
American Di-Electric, Ltd.
Irvington Varnish & Insulating Co.

**Insulation. (See also Paints)**
American Di-Electric, Ltd.
Anderson M. Co., A. & J. M.
Dolph Co., J. C.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Irvington Varnish & Insulator Co.
Westinghouse Elec. & Mfg. Co.

**Insulation, Slot**
Irvington Varnish & Insulator Co.

**Insulators. (See also Line Material)**
Anderson M. Co., A. & J. M.
Don-O-Lac Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
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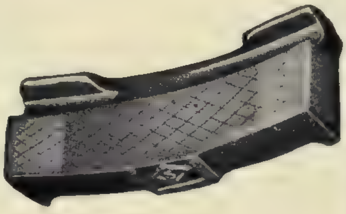

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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Ajax Metal Co. .... 53
Allis Chalmers Mfg. Co. .... 21
Allison & Co., J. E. .... 21
American Abrasive Metals Co. .... 58
Amer. Brake Shoe & Fdry. Co. .... 55
American Car Co. .... 61
American Di-Electrics, Ltd. .... 45
American Electrical Works .... 41
American Insulating Machinery Co. .... 44
American Mason S. T. Co. .... 58
American Ry. Supply Co. .... 47
American Rattan & Reed Mfg. Co. 48
American Steel Foundries .... 39
American Steel & Wire Co. .... 42
Anaconda Copper Mining Co. .... 40
Anderson Mfg. Co., A. & J. M. .... 32
Archbold-Brady Co. .... 40
Archer & Baldwin, Inc. .... 50
Arnold Co., The .... 20

B

Babcock & Wilcox Co. .... 44
Barbour-Stockwell Co. .... 43
Bates Expanded Steel Truss Co. 33
Bayonet Trolley Harp Co. .... 35
Beeler, John A. .... 20
Bemis Car Truck Co. .... 49
Bennett-Field Cross Tie Co. .... 41
Bonney-Vehslage Tool Co. .... 47
Bound Brook Oil-less Bearing Co. 30
Brill Co., The J. G. .... 61
Buckeye Jack Mfg. Co. .... 48

C

Cambria Steel Co. .... 33
Cameron Electrical Mfg. Co. .... 42
Canton Culvert & Silo Co. .... 34
Carnegie Steel Co. .... 37
Chillingworth Mfg. Co. .... 36
Clark Mgr. Corp., E. W. .... 20
Cleveland Fare Box Co. .... 46
Collier, Inc., Barron G. .... 59
Columbia M. W. & M. I. Co. .... 60
Consolidated Car Fender Co. .... 14
Consolidated Car Heating Co. .... 22
Continental Fibre Co., The .... 44
Copper Clad Steel Co. .... 40
Cooper Heater Co., The .... 46
Cutter Co. .... 43

D

Dayton Mechanical Tie Co. ...24, 25

Page

Dahlstrom Metallic Door Co. .... 48
Day & Zimmermann, Inc. .... 21
Differential Steel Car Co., The .... 58
Dolph Co., J. C. .... 45
Don-O-Lac Co., Inc. .... 45
Drum & Co., A. L. .... 21
Duncan Lumber Company .... 40

E

Earll, Chas. I. .... 48
Eastern Mass. St. Ry Co. .... 51
Economy Electric Devices Co. .... 15
Electric Equipment Co. .... 50
Electric Railway Equipment Co 41
Electric Railway Improvement Co. .... 43
Electric Service Supplies Co. .... 9
Eureka Co. .... 34

F

Feustel, Robt. M. .... 20
Flood City Mfg. Co. .... 10
Ford, Bacon & Davis .... 20
Ford Chain Block Co. .... 45
Fort Pitt Spring & Mfg. Co. .... 49
"For Sale" Ads .... 50

G

Galef, J. L. .... 49
Galena-Signal Oil Co. .... 17
General Electric Co. .18, Back Cover
Gladium Co., Inc. .... 44
Gold Car Heating & Ltg. Co. .... 46
Gould Coupler Co. .... 36
Gould, L. E. .... 20

H

Hamilton & Hansell, Inc. .... 37
Haskelite Mfg. Corp. .... 53
"Help Wanted" Ads .... 51
Hemingray Glass Co. .... 41
Hemphill & Wells .... 20
Holst, Englehardt W. .... 20
Horne Mfg. Co. .... 49
Hubbard & Co. .... 40

I

International Register Co., The. 47
International Steel Tie Co. .... 11

J

Page

Jackson, Walter .... 20
Jeandron, W. J. .... 39
Johnson Bros. .... 50
Johnson Fare Box Co. .... 47

K

Kuhlman Car Co. .... 61

M

McCardell & Co. .... 40
Massey Concrete Products Co. .... 41
Metal & Thermit Corp. .... 12
Mica Insulator Co. .... 44
Midvale Steel & Ordnance Co. .... 33
More-Jones Brass & Metal Co. .... 28

N

Nachod Signal Co., Inc. .... 40
National Brake Co. .... 19
National Electric Specialty Co. .... 42
National Pneumatic Co., Inc. .... 13
National Railway Appliance Co 53
Nelsonville Brick Co. .... 42
New York Switch & Crossing Co. 42
Nichols-Lintern Co. .... 48
Niles-Bement-Pond Co. .... 35
Nuttall Co., R. D. .... 38

O

Ohio Brass Co. .... 7

P

Page & Hill Co. .... 23
Pantasote Co. .... 29
Parsons, Klapp, Brinckerhoff & Douglas .... 20
Percy Mfg. Co., Inc. .... 47
Positions Wanted and Vacant .... 51
Post & Co., Inc., E. L. .... 49
Power Specialty Co. .... 43

R

Railway Improvement Co. .... 16
Railway Track-work Co. .... 8
Railway Utility Co. .... 58
Ramapo Iron Works .... 42
Rawls Machine & Mfg. Co. .... 43
Richey, Albert S. .... 20

Page

Roebling's Sons Co., John A. .... 40
Rooke Automatic Register Co. .... 47

S

St. Louis Car Co. .... 38
Safety Car Devices Co. .... 5
Samson Cordage Works .... 48
Sanderson & Porter .... 20
Scaife & Sons Co., Wm. B. .... 43
Schutte & Koerting .... 44
Searchlight Section .... 54 55
Sherwin & Williams Co. .... 46
Smith & Co., C. E. .... 20
Smith Heater Co., Peter .... 46
Smith-Ward Brake Co. .... 53
Standard Steel Works Co. .... 31
Star Brass Works .... 53
Stone & Webster .... 20
Stucki Co., A. .... 49

T

Terry Steam Turbine Co. .... 26
Thompson-Levering Co. .... 43
Tool Steel Gear & Pinion Co. .... 39
Trackless Trans. Co. .... 55
Trolley Supply Co. .... 48
Tubular Wover Fabic Co. .... 27

U

U. S. Electric Signal Co. .... 42
United States Graphite Co. .... 49
Universal Lubricating Co. .... Front Cover

V

Van Dorn Coupler Co. .... 55

W

"Want" Ads .... 50
Wason Mfg. Co. .... 61
Western Electric Co. .... 6
Westinghouse Electric & Mfg. Co. 2
Westinghouse Traction Brake Co. 4
Wharton, Jr., Co., Wm. .... 42
White Electrical Supply Co. .... 32
White Engineering Corp., J. G. 20
Williams & Co., J. H. .... 46
Wish Service, The P. Edw. .... 21
Wood Co., Chas. F. .... 40

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**The Columbia Machine Works & Malleable Iron Co.**

# A Conventional Form—Plus!

To the customary formal closing salutation of correct correspondence, we attach a real meaning when we write you offering prices and service.

By "yours truly" we mean that our completely equipped shop, our unequalled facilities, our expert staff, and our long experience are *truly yours*, to satisfy your every want in shop work.

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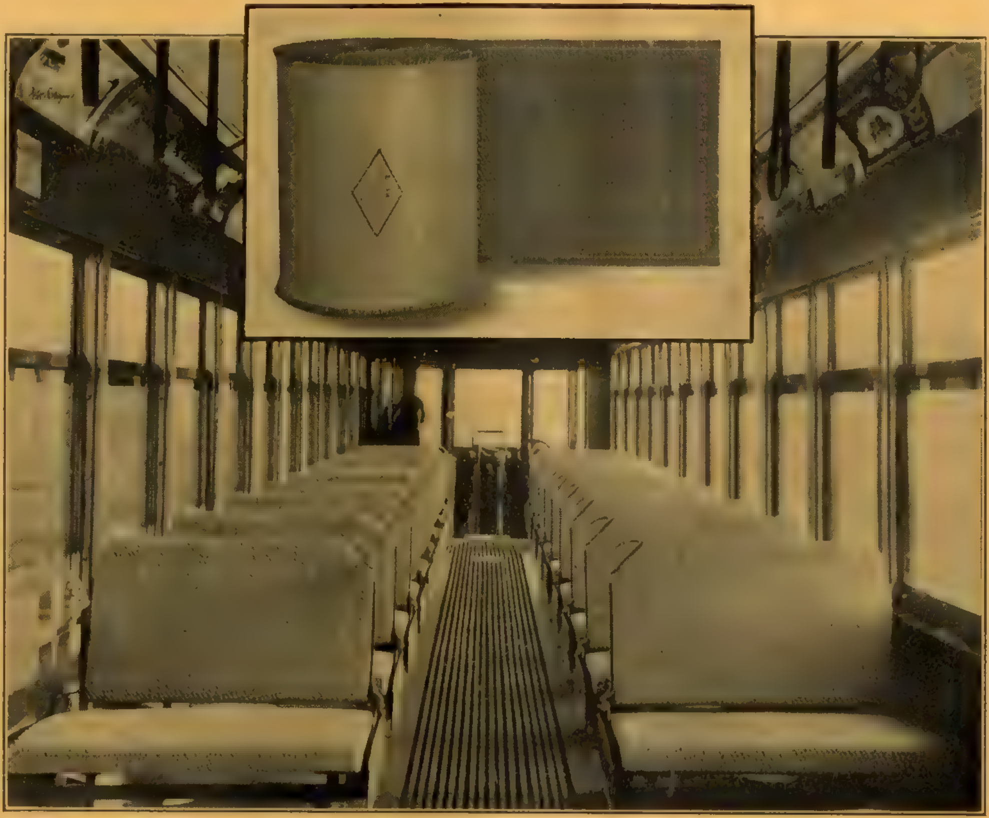

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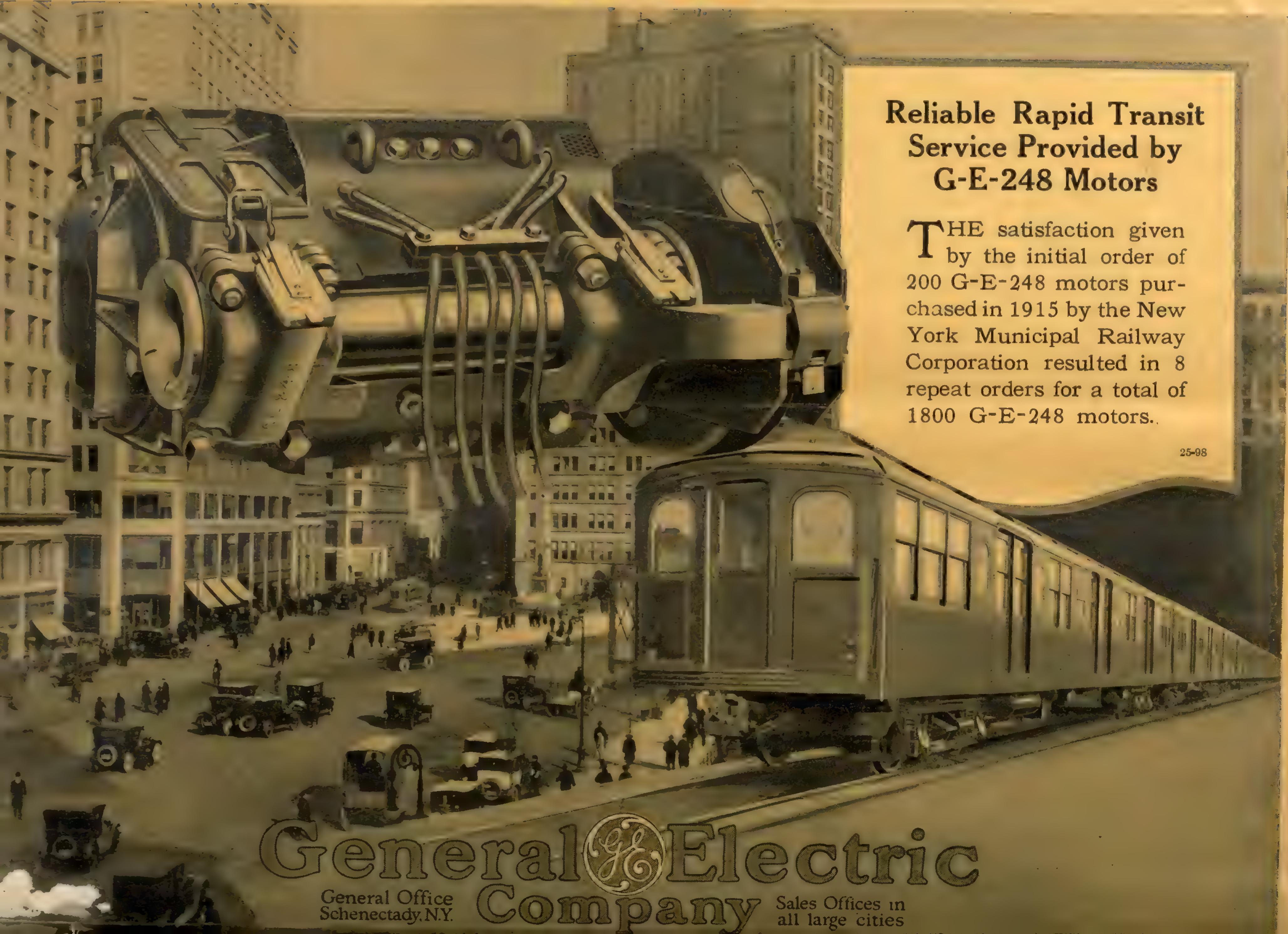

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THE satisfaction given by the initial order of 200 G-E-248 motors purchased in 1915 by the New York Municipal Railway Corporation resulted in 8 repeat orders for a total of 1800 G-E-248 motors.

25-98

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# ELECTRIC RAILWAY JOURNAL

"A type of track construction which constantly has been gaining headway"—

Editorial in the
Electric Railway Journal
for July 23, 1921

THE INTERNATIONAL
STEEL TIE CO.
CLEVELAND

Steel Twin Tie Track

# Looking Ahead

"Joe," said the Vice President, "I am glad to see that you refer to Westinghouse Railway Operating Data. It has always proved quite helpful to me in the days when I had your job. Additional information is issued each month, I understand."

"Yes, Boss. I have been reviewing their recommendations for preparing old motors to withstand severe winter service. I am going to see that all armatures and fields are dipped and baked, and that Westinghouse instructions are used in doing the work."

"Fine, Joe! Also be sure to get the sweepers and snow plows in shape early this year."

*Ask for Westinghouse Railway Operating Data*
*Leaflet No.* 1600

**Westinghouse Electric & Manufacturing Company**
**East Pittsburgh, Pa.**

# Westinghouse

*Vol. 58, No. 9* New York, August 27, 1921 *Pages* 305-344

# Electric Railway Journal

**Henry W. Blake** and **Harold V. Bozell**, Editors **Henry H. Norris, Managing-Editor**

## *Contents*

### Three-Wire Railway Distribution in Wilmington, Del.

Improves regulation and prevents electrolysis. Trial proves system best adapted to radial city districts. Substation equipment must be flexible. Results of tests for electrolysis with two-wire and three-wire distribution....Page 307

### Bus or Retrack?

In an interesting article Walter Jackson presents a study on the place of the motor bus, particularly in cases where the existing traffic on electric railways is not sufficient to justify new rail and continuance of the paving burden.................................................................. Page 315

### Reconstruction of Track and How It Was Financed

Authorized by the Public Service Commission, the Gary Street Railway finances locally the reconstruction of 1.8 miles of track, using mechanical ties to reduce the thickness of concrete and avoid too great rigidity.......Page 321

EDITORIALS ................................ 305
MOTOR TRUCKS IN NEW ENGLAND............ 311
THE PROBLEM OF THE FARE................. 312
SAFETY CARS MAKE GOOD IN OAKLAND....... 314
BUS ROUTE FOR PENNSYLVANIA.............. 318
ELECTRIC RAILWAYS OPERATING MOTOR BUSES.. 319
BUSES DO LARGE BUSINESS.................. 319
DETROIT TROLLEY BUSES.................... 320
SAGINAW SERVICE STILL SUSPENDED.......... 323
TENTATIVE SETTLEMENT DRAFT PRESENTED.... 325
EQUIPMENT AND ITS MAINTENANCE.......... 326
Hose Dismantling and Assembling Machine.
New Locomotive for Tidewater Southern Railway.
Concrete Breaker in Cleveland.
New Ear for Trolley Lines.
AMERICAN ASSOCIATION NEWS............... 328
Annual Convention Programs Ready.
Entertainment Committee Meets.
NEWS OF THE ELECTRIC RAILWAYS............ 331
FINANCIAL AND CORPORATE.................. 335
TRAFFIC AND TRANSPORTATION............... 338
PERSONAL MENTION ........................ 342
MANUFACTURES AND THE MARKETS........... 343

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# A GROWING DEMAND PROVES ITS WORTH

Recent figures show 6,500 Westinghouse DH-16 "Bungalow" compressors now in use—and the number growing. This fact in itself is sufficient to substantiate the claim that no other machine so fully meets the requirements of the light or medium weight car, where a capacity of 16 cu. ft. per minute is ample to insure the maintenance of an adequate supply of air for the various functions of the brake and control equipment.

Among the outstanding features of the DH-16 are Compactness, Light Weight, Low Cost, High Efficiency, Quiet Operation, Positive Lubrication, Accessibility, Ease of Assembly, Durability and Low Maintenance.

The City of Detroit, Department of Street Railways, basing its action on previous experience, has ordered 200 of its new Safety Cars equipped with these compressors.

*Ask for Publication* 9045.

**WESTINGHOUSE TRACTION BRAKE CO.**

*General Office and Works, Wilmerding, Pa.*

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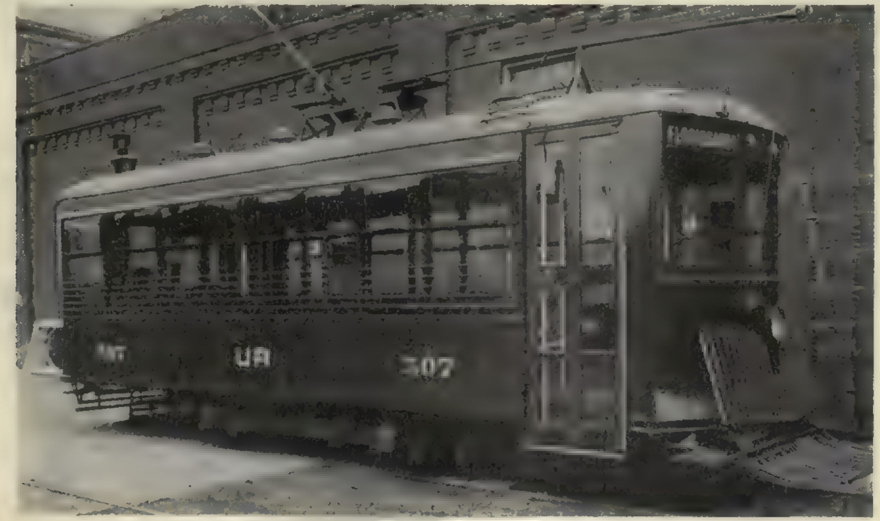
*On the latest type of St. Louis double-truck cars O-B Bases, O-B Catchers and Imperial Headlights are standard equipment. St. Louis trailers and the motor cars which haul them, are equipped with Tomlinson Couplers.*

# St. Louis Knows — and Uses — O-B Car Equipment

Big, double-truck, heavy traffic cars and the quick, efficient little safeties combine to handle St. Louis' population effectively.

On both types of cars, O-B Bases, O-B Catchers and Imperial Headlights are helping to make the service successful. In addition, the large cars carry Tomlinson Couplers.



*St. Louis Safety Cars also use O-B Bases, O-B Catchers and Crouse-Hinds Imperial Headlights.*

## The Ohio Brass Co.

Mansfield, Ohio, U. S. A.

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco Paris, France

*Products*: High Tension Porcelain Insulators; Trolley Material; Rail Bonds; Electric Railway Car Equipment; Third Rail Insulators.

*General Sales Agents in U. S. for Crouse-Hinds Imperial Headlights*

Phono-Electric

Here's Two of a Kind

On both the trolley system and the electrified steam road shown (at Bridgeport) PHONO-ELECTRIC is the trolley wire used.

And on both installations the tough characteristics of PHONO-ELECTRIC are emphasized. It gives long service against the strong, steady pressure of contact shoe, on the electrified system—and resists great wear at points of lowered suspension, as under bridges. Overhead trouble, delays or blocks at such points can be avoided only by the use of the wire of greatest wear-resistance—PHONO-ELECTRIC.

Prevent Wire Trouble With Phono-Electric At All Such Points

Bridgeport Brass Company

Bridgeport Connecticut

**It's a long road that has no rough spots**

**Keystone Steel Gear Cases**

Rough road bed and its consequent vibration to rolling stock and the inevitable obstructions that find their way to the road bed are less liable to crack or break Keystone Gear Cases. They are made of soft, open-hearth special analysis steel, which bends before it breaks.

The periphery strips and sides are formed and riveted. But Keystone Cases do not depend on rivets alone.

In addition they are electrically welded between the rivets to prevent slippage between sheets and subsequent loosening of rivets.

The result is a light, tight, rigid gear case which will withstand vibration and hard knocks. The nose brackets are so riveted to the case that the rivets pass through five thicknesses of metal.

Standardized for nearly all types of railway motors.

***Send for data sheets.***

**ELECTRIC SERVICE SUPPLIES CO.**

***Manufacturer of Railway Material and Electrical Supplies***

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**17th and Cambria Streets**

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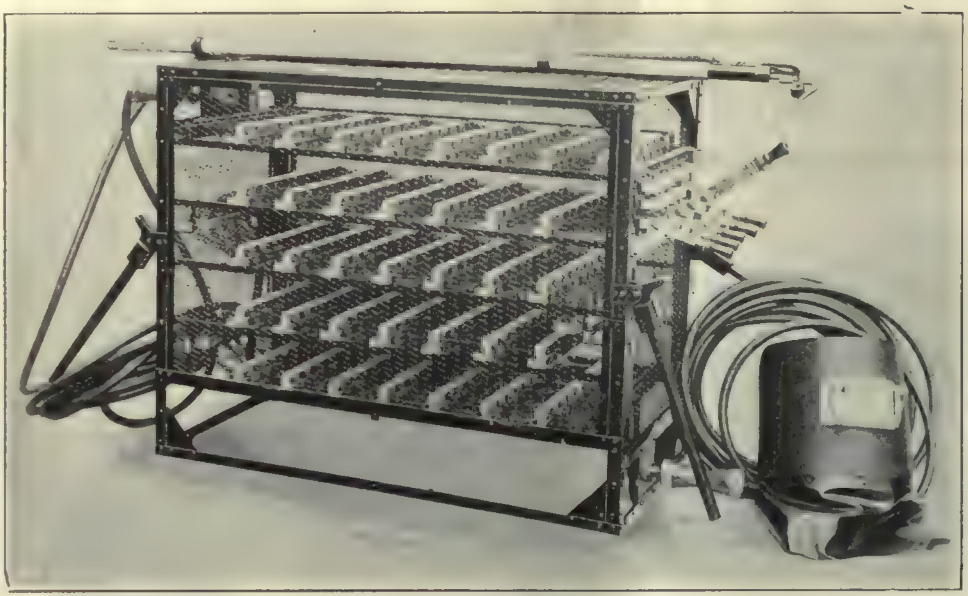
**Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal, Toronto**

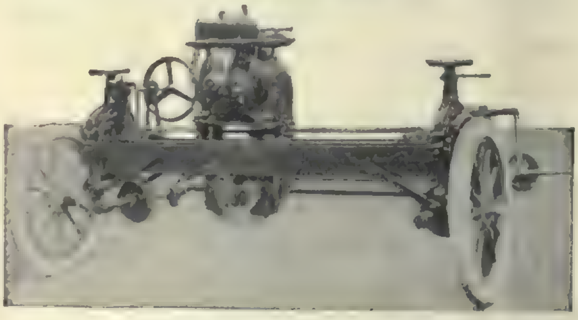
# Save That Track For Another Year!



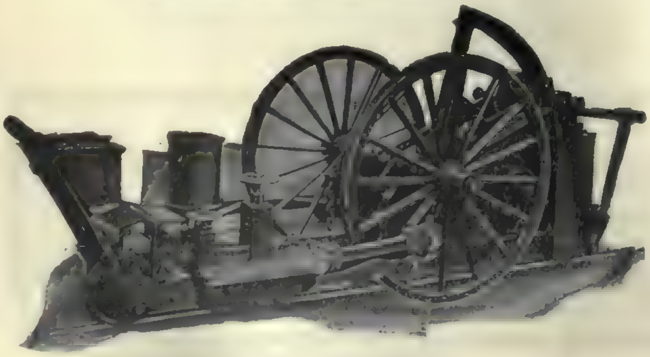
AJAX Electric Arc Welder

**Complete Track Salvage Equipment**

ATLAS Rail Grinder



UNIVERSAL Rotary Track Grinder



RECIPROCATING Track Grinder

## What Will New Track Cost?

Prices have dropped somewhat, but not yet to pre-war levels. Steel is still 50% above the old scale. Look over your old track, which is getting into pretty bad shape, and you will be surprised how much of it you can put into good operating condition for another year or two, by building up broken places, and grinding down the rough spots.

Count the cost of new track material and labor, before deciding to scrap it.

## Welding and Grinding as an Economical Salvage Method

Welding and grinding can be done by low price labor, and it is astonishing how rapidly a few small groups of men, equipped with Ajax Welders, and any of our rail grinders can put bad track into remarkably good condition.

**Railway Track-work Co.**

**3132-48 East Thompson St.**
**Philadelphia, Pa.**

*Modernize!* *Pneumatize!*

# The Lesson of the Soda Fountain

Yesterday's soda clerk did everything by hand.

Today's soda clerk is provided with all sorts of conveniences, including motor-driven mixers, not to make things easier for him necessarily, but to enable him to serve more customers in a given time, and give them better milk-shakes in the bargain!

Yesterday's motorman and conductor also did everything by hand.

Today's motorman and conductor are relieved of all unnecessary manual labor, not only to make things easier for them—desirable as that is—but to enable them to serve more customers in a given time and to serve those customers with greater speed, safety and courtesy than was possible when thousands of their daily movements were devoted to actions that can be done better and faster by electro-pneumatic power, through

## National Pneumatic

Door and Step Control
Door and Step Operating Mechanisms
Motorman's Signal Lights
Safety Interlocking Door Control
Multiple Unit Door Control

*Manufactured in Canada by*
Dominion Wheel & Foundries, Ltd.
Toronto, Ont.

National Pneumatic Company, Inc.
50 Church St., New York
Edison Bldg., Chicago
Works: Rahway, N. J.

# A $6,000,000,000 Industry Goes Shopping

The American spirit of fair play is putting public utilities on a sound financial basis. As a result, electric railways are swinging into a tremendous program of rehabilitation and needed extension. From everywhere comes news of purchases of rolling stock, way material, power and shop equipment, and—the newest feature—buses for supplementary service.

The field is alive with the spirit of progress. The industry—city, suburban and interurban—is a market for thousands of commodities and the men who decide what shall be bought are looking, as always, to the

## Electric Railway Journal

for whatever will help develop, operate and maintain their properties.

***The Annual Convention Issue*** (Sept. 24, 1921), for over a generation an expected and welcomed feature of the American Electric Railway Association's annual convention, will exhibit in its advertising pages the newest products of the industry's leading manufacturers.

***Details regarding the market for any commodity gladly submitted.***

**Electric Railway Journal**
**Tenth Ave. at 36th St., New York**
***"The Bible of the Industry"—***
**A McGraw-Hill Publication**

*Have you reserved your Exhibit Space?*

*A straightforward business proposition*

THERE'S no mystery about Tulc or Universal Lubricating Service. Our claim that we can save 40% of your oil bills—50% of labor in applying and a large part of your repair bills isn't merely an endeavor to induce you to go to the trouble of writing to us.

It's a *straightforward business proposition* that ought to help us both.

If we hadn't made good on our claims, 9 times out of 10, we wouldn't be growing so fast or serving a steadily increasing number of the most progressive Electric Railways in the country today.

But we've produced results for these Companies and we can produce results for you. Write today for complete data without expense or obligation.

**"Overall Specialists"**

The service men who work with you on your lubricating problems are not "experts on theories." They put on overalls and get right down to brass tacks—pack your cars—show you how and why Tulc should be used. They get results—real money saving results—99 times out of a hundred. The hundredth time there is no charge for the service.

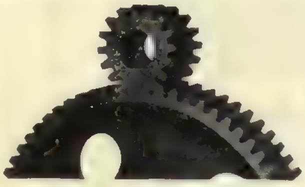
***The* Universal Lubricating Co.**
**Offices: Schofield Bldg. Works: Sweeney Ave.**
**Cleveland, Ohio**

TULC
A
LUBRICANT

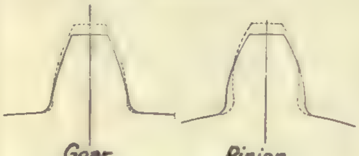
**—scientifically and accurately compounded to reduce lubricating costs**

# Nuttall Achievements

The success of the R. D. Nuttall Company in the manufacture of railway and industrial gearing is represented in a measure by the developments given below — all of which have been originated by the Nuttall Company.

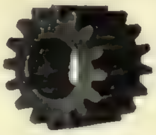


*Helical Gearing*



*Dotted line shows tooth-form 4½° involute. Solid line shows tooth-form of Nuttall Helicals.*

*Rounded Teeth*



*Pinion with Ground Bore*

*Pinion without Ground Bore.*

*Special Drop Forged Pinion Blank*

## Helical Gears and Pinions

Nuttall Helical Gearing, manufactured since 1914 in a constantly increasing volume, has conclusively demonstrated its superiority in every class of railway service.

## Improved Tooth Form for Helical Gears

The tooth form of Nuttall Helical Gears is of the long and short addendum type and has the following advantages:

- (*a*) Greater rolling action.
- (*b*) More metal between root of tooth and bore of pinion.
- (*c*) A strength of 2½ times that of the 14½% involute.

## Rounded Teeth

The ends of all Nuttall gear teeth are rounded. This characteristic affords a ready means of identification, and avoids sharp curves.

## Ground Pinion Bores

The bores in all Nuttall Motor Pinions are carefully ground to proper taper. This assures a correct fit on the armature shaft, thereby preventing injury to, and prolonging the life of, the shaft taper.

## Special Drop-Forged Pinion Blanks

Nuttall Pinions, made from "Special Drop-Forged Blanks" stood the "Acid Test" in actual service before being placed on the market. The secret of their success lies in the basic material, the method of forging, and Nuttall workmanship—resulting in a comparable longitudinal and transverse strength.

**R.D.NUTTALL COMPANY**
**PITTSBURGH PENNSYLVANIA**

All Westinghouse Electric and Mfg. Co. District Offices are Sales Representatives in the United States for Nuttall Electric Railway and Mine Haulage Products.

**Nuttall**

The World's best Lubricants

GALENA QUALITY

# Weighed in the Scales of Service

*Lubricating oils* may be measured in gallons, but *lubrication* can be correctly measured only by the gauge of *service rendered*.

Lubricating value can be secured from oils in the same proportion that it is carried in their physical make-up—and no more.

Figuring lubrication costs by gallonage prices of oil is on a par with figuring efficiency in employees by their avoirdupois.

Galena Oils are the products of years of experience in the requirements of railway lubrication. Only the highest grade stocks enter into the special process of their manufacture. It is *quality* that endows them with ability to carry their lasting, protective film and render in mileage double the service of ordinary oils.

In the scales of *Service* the weight of Galena superiority is quickly evident. On hundreds of electric railways these oils are proving the truth of the assertion: "It is not the gallon of oil, but the lubrication units the gallon contains—that count!"

*Galena Quality Is Our Bond*
*and Your Security!*

TRIGRAM
G S O C
TRADE MARK

THE GALENA-SIGNAL OIL CO.
NEW YORK FRANKLIN, PA. CHICAGO
*Offices in all principal American Cities*
LONDON BUENOS AIRES PARIS

GALENA SERVICE

*There is no surer way of keeping cars off the pit than by maintaining the original equipment quality of their wearing parts*

## A Time and Trouble Saver for the Purchasing Agent

The G-E Renewal Parts Catalog for car equipment makes it easy to order new parts with the positive assurance that such parts are exact duplicates of those supplied on the original equipment. Each part is pictured, titled and numbered.

In this catalog, compact yet complete, there is a separate bulletin for each piece of apparatus. It is always up to date, for as changes are made in the equipment, new sheets are sent out to be inserted in the loose leaf binder.

This Renewal Parts Catalog service is sent free to users of G-E car equipment. No purchasing agent can afford to be without it.

**General Electric Company**

General Office
Schenectady, N.Y.

Sales Offices in
all large cities

10-203

# Electric Railway Journal

*Consolidation of Street Railway Journal and Electric Railway Review*

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## Wanted, Specific Data on Electric Locomotives

HASN'T there been enough general discussion on certain features of heavy electrification? Most engineers agree that electrification generally will decrease the operating ratio by increasing the traffic and by saving coal, but that each problem is a case for special study as to the ultimate saving involved and the system of electrification to be chosen. All the foreign commissions have ended their study of American systems and installations by saying "it depends on the specific application."

Why should there not be some more definite discussion on the electric locomotive? Shall the motors be built on the axles, should direct gearing or quill drive be used, should connecting or coupling rods be employed for transmission, and how does freight or passenger service affect these decisions? What is the best method to lubricate the motor, and where should the motor be placed so that it can be inspected and repaired with the greatest ease? What kind of control should be used and where should it be located? What real basis for rating the motors can be devised?

On matters of this sort there seem to be plenty of opinions of a diverse character, but a great dearth of reliable data collected from service operations. There have been enough installations of various kinds to accord data which would fix some features of design and enable railway men to have some definite knowledge in regard to heavy electrification equipment. Topics along this line could well be selected for some of the coming association or club meetings on heavy electric traction rather than the general economies of the subject.

## How About a Cushion?

THE use of equipment until it falls to pieces, the deferred maintenance on tracks, the worn crossings and high rates of acceleration and braking have developed the fact that the failure of many car parts is due to fatigue and to metal crystallization caused by shock loads.

A bad track necessarily increases the stresses on a car by causing the frame to sway, by at times raising diagonally opposite wheels and by throwing parts out of line on curves. It also injures and fatigues the metal in the axles, breaks bearings and causes intangible deterioration to the car, since the springs have a limited range of operation and serve only to relieve the shocks and strains on certain parts.

Another result of these conditions is the effect on service quality. Every passenger appreciates a car that does not jump or jar because of bad tracks. Every railway manager realizes the effect of bad tracks on schedules and power consumption and desires more riders to patronize his system. What are the remedies?

There are two which come to mind. One of these is to put the tracks and special trackwork in good shape. Money is not plentiful but enough should be found to purchase a grinder and repair tools and to pay repair gangs, even if some other things are neglected. The second remedy may be to make some change in car designs in the way of more cushions on the car parts. Educated to some extent by the rubber-tired vehicles with their easy riding qualities, people today are more particular about this point than they were. They like easy riding street cars as well as automobiles. This is a matter which can well be considered by car designers. Aside from the advantages derived in gaining public favor and thereby increasing patronage, there will also be quite tangible results in reduced maintenance costs.

## How Can Mass Transport Remain a Monopoly?

THE disconcerting ease with which any desired kind of automotive service can be established by companies or individuals is something that threatens absolutely to imperil the permanence and the growth of the cheaper and basic forms of transport on rails which still remain necessary for the heavier work in moving the public. An unkempt, irresponsible example in the United States and Canada has been the jitney. In Great Britain a new antagonist, in addition to existing bus companies, has put in an appearance during this year through the falling away of certain war-time restrictions. Any one who now desires to establish a motor-bus service can do so upon payment of the national license fees for public utility vehicles without depending upon the consent of the local authorities. Thus, in any city where the community itself may not have secured the right to run buses, it will be possible for others to do so when, where and how they please.

Truly, this is an absurd situation, for in all the generations since the establishment of transportation franchises those who served as public carriers have had certain, definite responsibilities. But the development of the automotive vehicle has been so amazingly swift that the law is still a long way from dealing with it in a way that will protect those who have invested most in giving the public what might be called the "substantial" transportation service. This is indicated also by the fact that Parliament has just refused steam railroads the blanket right to run auxiliary or co-ordinating bus services, while making this grant freely to all others except municipalities. The reason for this invidious exception of the railroads has been attributed to a deliberate effort to stimulate wasteful competition instead of promoting co-operation on the part of many elements of the public—especially the commercial classes who ought to know that in the long run all waste must be paid for.

The present conditions in Great Britain offer a clear warning to both the electric and steam railways on this side that they had better hurry to get all the motor-bus rights possible if they want to avoid possible like treatment of them in the early future. Something more constructive than anti-jitney ordinances is needed if all the mass transportation in a district is to be kept under the direction of the organization with the greatest resources and experience and of proved reliability. That organization is the electric railway.

### Much to Be Learned on Both Sides

DURING the past six months visitors to America have included railway managers and engineers from a number of countries abroad, seeking light on various traction problems. This fact should not beguile Americans into a belief that their practice is perfect or even better in all respects than that across the Atlantic. In one particular it is true America leads the world. It has more miles of track electrically equipped than any other country, and for this reason this country may be ahead in many technical features as regards transportation over rails. There is a much larger field here than in any single country abroad for a device which promises a saving in operating expenses, so it is not surprising that inventors and good inventions abound. It is not that European managers are behind their American colleagues in appreciation of technical advances but there is not the same opportunity for their development.

On the other hand, an obligation to depend on one's own resources has often been the means of developing an acute sense for utilizing the means at one's disposal, and it is probably true that American visitors to foreign shores would find as much in electric railway lines to instruct them as will be found here by those who come here from Europe and South America. This is particularly true in the commercial aspects of the business as well as in the co-ordination of various means of transit, such as bus and trolley. Where traffic is scant, prospective passengers have to be urged to take the cars, and this has made the art of merchandising transportation, with all that that expression implies, one worth cultivating, and American managers could do worse than to adopt some of the best traffic stimulators used abroad. To paraphrase the famous saying of Sir Roger de Coverley, "There is much to be learned (said) on both sides."

### Limited Financing Can Be Done

A GOOD EXAMPLE of how an electric railway company may overcome the extreme difficulty of securing new money for capital expenditures is afforded in the accomplishment of the Gary Street Railway, related elsewhere in this issue. The officials met with that refusal from the usual financing agencies with which many railway executives are familiar, and they decided to see what could be done at home. Some badly needed reconstruction of important track on a street undergoing paving provided the necessity from which sprang new ideas. It was decided to try out the employees as a source of money, and the response was immediate and surprisingly generous. Having themselves a financial interest in the enterprise, the employees thereafter made ideal salesmen to peddle more of the same securities to the public, and they succeeded and incidentally earned a small commission on each bond sold.

The plan is particularly appropriate for the small company where the employees can be closer to the management. But it has also been followed with reasonable success in some of the large utility companies. Not only does it accomplish the immediate need of the company for new money, but it gives the employees a new and far more tangible interest in the success of the company and furthermore extends the distribution of these securities among local residents, which is greatly to be desired. Railway companies, both large and small, may well indeed seriously examine this Gary experience. The indirect results of better employee and public relations may be of even greater importance than the direct result of securing capital.

When one sees successful financing on such basis as this, it seems reasonable to suggest that no railway company should be willing to say that it cannot finance any badly needed new work until it has tried and exhausted the possibilities of employee-customer financing. Of course, there must be the condition that the securities so offered are sound and the prospects of earning the promised interest or dividends good.

### Electrolysis—and Remedies

ELECTROLYSIS is to railway companies like inductive interference to power companies—it refuses to take a standardized treatment and causes constant irritation.

Local conditions make each cause of electrolysis worthy of special study. The effects of soil corrosion, soil constituents, system layout and equipment and climate conditions are so marked and the opinions of engineers differ so greatly as to the limits to be set for track to earth potentials, that each example of disease affords opportunity for a special clinic. Many years of experience in many localities, however, have afforded data and remedies. With these available it should be possible to cure each case after the correct diagnosis has been made.

There have been pro and con arguments on the "pipe drainage" system, the "insulated negative return" system, the "welded track" system, and there is the rather unique "three-wire" system used in Los Angeles, Winnipeg, Omaha, Milwaukee, and Wilmington. In some of these cities the three-wire system has been used to supplement or to supersede other systems. The data available do not prove it to be a cure-all for electrolysis but do prove that it greatly improves conditions if used with intelligence. It still appears that a well-bonded track or a welded rail track is the best general remedy, although soil conditions, light rails and heavily motored equipment, etc., may require the supplementary use of other systems.

Electrolysis is a fact that must be faced and the increased use of underground power and telephone cables, water and gas pipes, reinforced concrete and steel structures have increased the seriousness of its occurrence. In these days when track maintenance has been deferred by many railway properties, it would be a wise move to check up on track and electrolysis conditions and, if necessary, remove the causes before agitation by others affected stirs up a hornet's nest of public sentiment. The railways cannot afford to antagonize public sentiment by neglecting to remove causes for political or technical bludgeoning by outsiders. The fences must always be watched carefully in the railway industry.

# Three-Wire Railway Distribution in Wilmington

### Improves Regulation and Prevents Electrolysis—Trial Proves System Best Adapted to Radial City Districts—Substation Equipment Must Be Flexible

BY A. P. WAY
The American Railways, Philadelphia

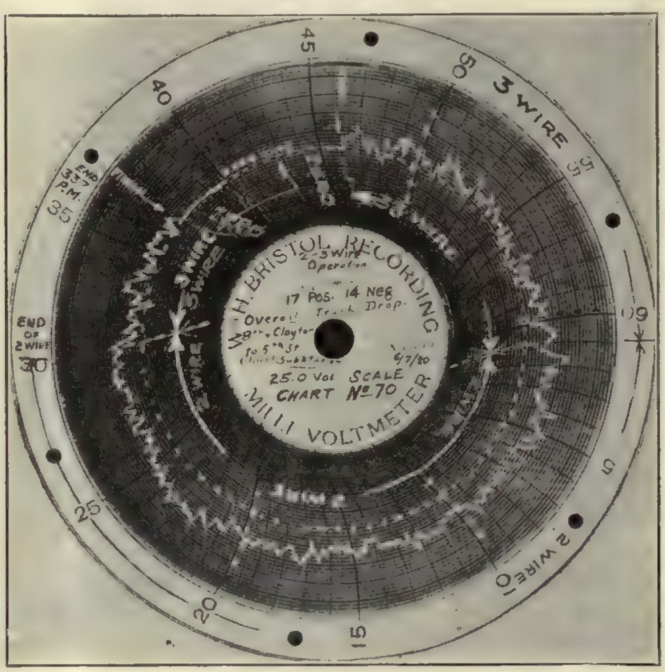
DURING 1915 there was a consolidation of electric railways in Wilmington, Del., and one large economy was accomplished by shutting down a steam generating plant in the southwest section of the town in order to carry the entire railway load from a larger plant in the northeast section nearer the load center. This necessitated the use of motor-driven boosters to deliver satisfactory operating voltage to two long suburban lines; also the distance of feeding some other divisions was materially increased. No provision had been made to take care of the additional return current into the plant, which was supplying a normal combined load of about 3,000 amp. with short-period peak loads of 4,000 to 4,500 amp. To make matters worse in regard to this return current, the Brandywine Creek was located between the plant and about 90 per cent of the load with only two single tracks on bridges and insufficient copper to supplement the rails.

When both plants were operating there were neutralizing potentials in the territory between them, making a resulting small track drop between stations with a corresponding small tendency for stray current, but when all current flowed in one direction the track drop was proportional to the sum rather than the difference of the currents.

It did not take long for the gas, water and telephone interests to find that their underground structures were in danger and they promptly notified the railway company. In that this difficult problem was worked out in close co-operation by engineers of all utilities interested, it is thought that a story as to how results were obtained and the difficulties encountered would be of interest to railway engineers.

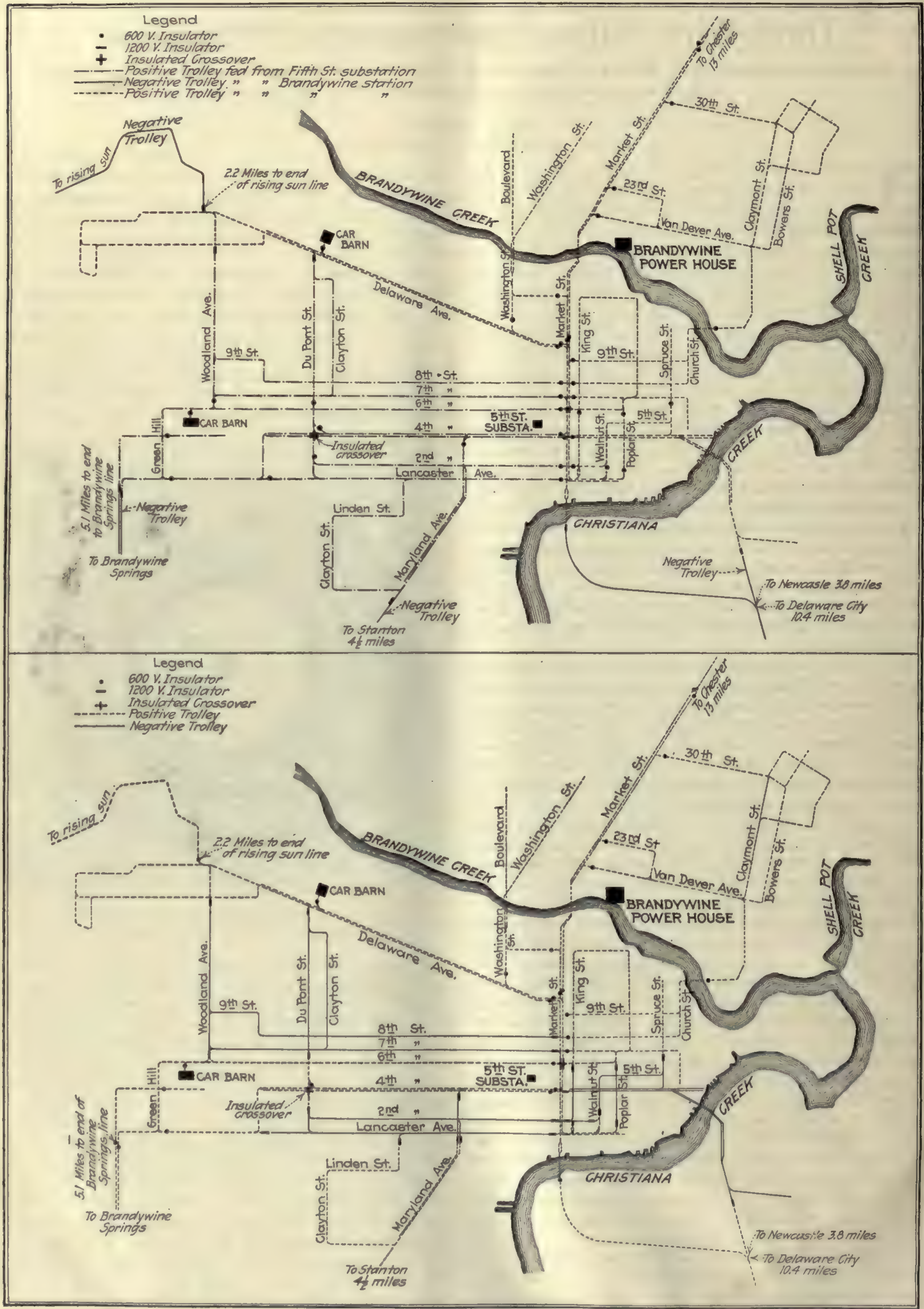
A very brief study of the distribution and a few preliminary tests showed clearly the cause of trouble, and without making an elaborate survey quick remedies were applied to remove temporarily the stray current in the neighborhood of the power house before a more thorough study could be made for more permanent remedies. It was found that all the underground structures were carrying considerable current toward the power house and these showed a relatively large positive potential to earth and to rails near the plant with the exception of the lead-covered power cables which were liberally drained at the plant. Further, there was considerable potential difference between different underground structures showing that there was a tendency for an exchange of current between them. To change conditions new drainage cables were erected to points along telephone cables and gas and water pipes on the south side of the creek and the underground structures nearer the plant were further drained while drainage of power cables was not increased. These steps were taken to reduce potentials between underground structures and to reduce potentials to earth but still to favor lead-covered cables to some extent. Considerable rebonding and renewal of jumpers about special work were accomplished as promptly as the much-disturbed labor conditions in that large powder manufacturing district in war time would allow.

A number of conferences of engineers of the utilities concerned were held and a plan was presented and put in operation. It was conceded that two or three substations in outlying districts would be the best remedy but labor was scarce and manufacturers could not supply the necessary equipment. After much delay two 500-kw. railway rotary converters were installed in the Fifth Street lighting substation near the center of the city railway load and 1½ miles from the power house. These rotaries took care of nearly 20 per cent of the total load. The generators and switchboard at the power house were arranged to supply a three-wire railway distribution with the neutral connected to rails, and the negative bus to feeders of four long suburban lines to the west and south of the city, two of which had boosters. The positive bus was connected to the feeders nearer the station and to the north. The negative load averaged nearly 30 per cent of the remaining load on the station. This arrangement of trolley polarity and relative location of stations is shown in an accompanying illustration.



SPECIMEN CHART SHOWING OVER-ALL TRACK DROP WITH TWO-WIRE AND THREE-WIRE DISTRIBUTION

Two of the engine-driven generators were arranged with shunt fields separately excited through D.P.D.T. field switches by which either field could be connected to the positive or negative bus as desired. A simple fool-proof interlocking plug switch was used as a mechanical barrier to prevent the main switch being thrown to the wrong bus and also to supply field current to the proper terminal of the D.P.D.T. field switch. The four feeder panels were provided with double-throw switches in order that the feeders could be connected to either the positive or negative bus. The series boosters automatically functioned properly.



Above, Original, and Below, Present, Arrangement of Three-Wire Distribution System in Wilmington

Out on the line 24-in. section insulators were provided to separate positive and negative trolleys. Shorter ones would probably have been adequate but those used were found in a manufacturer's stock at reasonable prices. For mechanical reasons a long section insulator was selected instead of two standard 8-in. insulators and those used have given perfect satisfaction. The location of these insulators was carefully selected in order to reduce the probability of both trolley poles being put up at once and so short circuit the insulator, and it was found that the best location was half way between intersecting streets. Through an error opposite polarities were placed on each side of some standard 8-in. section insulators, in which case arcs were carried and maintained across insulators by passing cars until the insulators were destroyed or the breakers at the plant opened.

### CITY TROLLEY POSITIVE, SUBURBAN NEGATIVE

The current for the four suburban lines to the west and south of the city passed outward over the same tracks through the central district that carried the return current from that central district, so that the resulting current flow in the city tracks was much reduced, which correspondingly reduced the average over-all potentials and therefore the tendency for stray current. This practically eliminated the positive areas of underground structures about the power house and the current flow in drainage was reduced to values only one-third or a quarter of previous values. This is what would be expected when the total resulting current returning to the station was approximately only one-third, although the railway output was reduced by only about 20 per cent by transferring some load to the Fifth Street substation.

In this three-wire distribution in Wilmington only entire feeders were reversed in polarity since it would have complicated car operation to subdivide them further. Moreover, there was not enough copper to give satisfactory voltage on further subdivision. However, in these long sections of positive track there was a tendency for the underground structures to carry a small portion of current and deliver it to cars operating over them. This caused a small floating positive area along these structures directly under the cars, but since this resulted in a two-way voltage condition at any given point, of relatively short duration of positive polarity, it was considered that the actual corrosion of these structures was quite negligible. This conclusion was substantiated by a very painstaking and practical investigation made by the National Bureau of Standards and published in their Technological Paper 72, also in proceedings of A.I.E.E., 1916. However, certain owners of underground lead structures were not ready to accept the idea of practical immunity from damage, particularly in the case of the nationally important New York-Washington underground telephone line that passed for a number of miles under one of these tracks of reversed polarity. This telephone cable was of such great importance during the war that all agreed that no chances could be taken. In this case the cable was made negative to earth at all times by draining it at a number of points through limiting resistances with separate line connected to the negative bus of the Edison direct-current system at the Fifth Street substation, the neutral of which is grounded indirectly to the railway return bus and therefore to the telephone drainage. Later a motor-driven booster was used as it was more economical. Two-way voltage conditions also existed in reference to gas and water pipes in some localities, but these were generally of short duration of positive polarity.

### PECULIAR EFFECTS ON SUBURBAN SECTIONS

The distribution of current to long suburban sections of positive rail beyond a city network of normally negative rail leads to some peculiar conditions. One suburban line of positive trolley runs to the northeast along the Delaware River for 14 miles to Chester, where it is also supplied from another station. Along this line near Naaman, about 8 miles from Wilmington, where the tracks cross a small stream, it was noticed that the telephone lead-covered cables showed a two-way voltage condition to earth and always negative to track whenever the Wilmington plant was running three wire. This positive condition had no relation whatever to operation of the cars of that division and it was evident that current was leaving the cables for some other section of the railway distribution. An explanation was advanced that some division of positive rail was responsible, but engineers representing underground structures would not accept this statement until it was definitely proved by graphic charts.

Whenever this load of reversed polarity was removed or supplied by current from positive trolley, the telephone cable at Naaman was decidedly negative to earth at all times. Apparently the tracks did not carry all the positive current required for the long suburban line to Delaware City, and some of the current actually did flow along the tracks and telephone cable to the northeast and pass into moist earth near Naaman to reach the tracks toward Delaware City by way of parallel low-resistance paths along the river, although Naaman and Delaware City are 18 miles apart as the crow flies. Part of the positive condition of telephone cables under the Stanton line, which was remedied by the boosted drainage line, was similarly caused by current endeavoring to get to this same Delaware City line of reversed polarity.

### FAILURE OF GENERATOR FORCES CHANGES

However, in April, 1918, before the difficulties were corrected, the largest railway generator in the Brandywine plant was damaged beyond repair which required quick action and allowed radical changes. It was deemed inadvisable to replace the lost railway generating capacity in the Brandywine plant, as it was some distance from the load center. Fortunately, at an associated railway property there were two 750-kw. rotaries available which were rushed to Wilmington and installed in the Fifth Street substation with the two 500-kw. rotaries already in operation. This increased the substation capacity sufficiently to allow it to carry 75 per cent to 80 per cent of the entire railway load. Later a substation was installed at New Castle which supplied the Delaware City line south, thus removing the expensive operation of the booster and the difficulties of stray current from this long suburban line. With the Brandywine plant carrying only the load north of the Brandywine Creek and the Delaware City line supplied separately, it was found that the balance of the load could not be carried satisfactorily from the Fifth Street station without an expensive installation of negative copper to supplement the tracks with some adaptation of an insulated negative return system to prevent unreasonable stray currents, or without resorting to an unlimited pipe drainage system. This latter was opposed by owners of underground structures and not generally approved by the railway management. Rather than install another substation beyond the city limits to the southwest, the three-wire distribution was again used, but quite differently from the former practice at the Brandywine plant.

In the substation, rotary converters could be arranged for reversal of polarity more conveniently than generators, as they could be maintained as self-excited machines. A plan of mechanical interlocking was provided by field plug switches to prevent the main switch from being thrown to the wrong bus, and the switchboard was provided with positive and negative buses of 1,200 volts with neutral connected to rails and certain feeders were provided with double-throw switches similar to the arrangement at the Brandywine plant for its feeder panels.

ELECTROLYSIS TESTS—WILMINGTON, DEL.—COMPARISON THREE-WIRE AND TWO-WIRE OPERATION

| Date | Time | | Oper. | Positive Post | Negative Post | Chart No. | Dist. | Max. Volts | | Average Volts | | | | Alg. Aver. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | From | To | | | | | | + | — | + | % | — | % | | |
| *Location—Front and Washington Streets* | | | | | | | | | | | | | | | |
| 6 11 20 | 11 10 | 11 30 | 3-W | Earth | Cable | 75 | .. | 0.3 | 0.22 | 0.08 | 60 | 0.04 | 40 | ... | Cable negative 60% |
| | 11.30 | 12 00 | 2-W | Earth | Cable | 75 | .. | 0.31 | ...... | 0.13 | 100 | ...... | ... | ... | Cable negative 100% |
| | 12.00 | 12 08 | 3-W | Earth | Water | 76 | .. | 0.8 | 0.4 | 0.35 | 99 | Momentary | | ... | Water negative 99% |
| | 11 30 | 12 00 | 2-W | Earth | Water | 76 | .. | 0 9 | 0.016 | 0.3 | 99 | Momentary | | ... | Water negative 99% |
| | 11 00 | 11.30 | 3-W | Gas | Earth | 77 | .. | 0.088 | 0 100 | 0.015 | 40 | 0.030 | 60 | ... | Gas negative 60% |
| | 11 30 | 11.36 | 2-W | Gas | Earth | 77 | . | 0 100 | 0.06 | 0.030 | 50 | 0.020 | 50 | ... | |
| | 11.00 | 11.30 | 3-W | Cable South End | Cable North End | 78 | 4′ | 3.8MV | ...... | 1.5MV | 100 | ...... | ... | ... | Current flow north 100% |
| | 11.30 | 11 36 | 2-W | Cable South End | Cable North End | 78 | 4′ | 4.4MV | ...... | 3.0MV | 100 | ...... | ... | ... | |
| *Location—Front and Tatnall Streets* | | | | | | | | | | | | | | | |
| 6/11 20 | 2.00 | 2.30 | 3-W | Cable | Earth | 79 | .. | ...... | 1.5 | ...... | ... | 0.8 | 100 | ... | Too heavily drained |
| | 2.30 | 2.37 | 2-W | Cable | Earth | 79 | .. | ...... | 1.6 | ...... | ... | 1.2 | 100 | ... | Too heavily drained |
| | 2 00 | 2.30 | 3-W | Earth | Gas | 80 | .. | ...... | 0.12 | ...... | ... | 0.04 | 100 | ... | Gas positive 100% |
| | 2 30 | 2.37 | 2-W | Earth | Gas | 80 | .. | ...... | 0.14 | ...... | ... | 0.08 | 100 | ... | |
| | 2 00 | 2 30 | 3-W | Earth | Water | 81 | .. | ...... | 0.18 | ...... | ... | 0 08 | 100 | ... | Water positive 100% |
| | 2.30 | 2 42 | 2-W | Earth | Water | 81 | .. | ...... | 0.30 | ...... | ... | 0.16 | 100 | ... | Water positive 100% |
| | 2 00 | 2 30 | 3-W | Cable South End | Cable North End | 82 | 5′ | 12MV | ...... | 7MV | 100 | ...... | ... | ... | |
| | 2.30 | 2.38 | 2-W | Cable South End | Cable North End | 82 | 5′ | 12MV | 4MV | 9MV | 60 | 2MV | 40 | ... | Current flow north |
| *Location—Delaware Avenue and Jackson Street* | | | | | | | | | | | | | | | |
| 6/14 20 | 3.09 | 3.30 | 3-W | Cable | Earth | 90 | .. | ...... | 1.4 | ...... | ... | 0 8 | 100 | ... | |
| | 3.30 | 4.00 | 2-W | Cable | Earth | 90 | .. | ...... | 2.2 | ...... | ... | 1.3 | 100 | ... | |
| | 3.09 | 3.30 | 3-W | Cable South End | Cable North End | 91 | .. | 4.8MV | ...... | 1.8MV | 100 | ...... | ... | ... | |
| | 3.30 | 4 00 | 2-W | Cable South End | Cable North End | 91 | . | ...... | 2.4MV | ...... | ... | 1 4MV | 100 | ... | |
| | 3.17 | 3 30 | 3-W | Gas | Earth | 92 | .. | ...... | 0.1 | ...... | ... | 0.03 | 100 | ... | |
| | 3.30 | 4 00 | 2-W | Gas | Earth | 92 | .. | 1.8 | 0.1 | 0 8 | 65 | 0.05 | 035 | ... | |
| | 3 16 | 3 30 | 3-W | Gas | Bell cable | 93 | .. | 1.0 | ...... | 0.35 | 100 | .... | ... | ... | |
| | 3 30 | 4 00 | 2-W | Gas | Bell cable | 93 | .. | 1.4 | ...... | 0.70 | 100 | .... | .. | ... | |
| | .... | ... | 3-W | Cable | Gas | Ind. | .. | ...... | 0.4 | ...... | ... | 0.2 | 100 | ... | |
| | ... | ... | 2-W | Cable | Gas | Ind. | .. | ...... | 1.4 | ...... | ... | 0.6 | 100 | ... | |
| *Location—Delaware Avenue and Adams Street* | | | | | | | | | | | | | | | |
| 6 14 20 | 2 00 | 2 30 | 3-W | Cable | Earth | 94 | .. | ...... | 1.0 | ...... | ... | 0.4 | 100 | ... | |
| | 2.30 | 2 40 | 2-W | Cable | Earth | 94 | .. | ...... | 1.4 | ...... | ... | 0.8 | 100 | ... | |
| | 2 00 | 2 30 | 3-W | H. P. gas | Earth | 95 | .. | ...... | 0.25 | ...... | ... | 0.14 | 100 | ... | |
| | 2.30 | 2 45 | 2-W | H. P. gas | Earth | 95 | .. | ...... | 0.25 | ...... | ... | 0.14 | 100 | ... | |
| | 2 00 | 2.30 | 3-W | Cable South End | Cable North End | 96 | 7′ | 2.0MV | 0.4MV | 0.6MV | 60 | 0.01 | 40 | ... | |
| | 2 30 | 2.40 | 2-W | Cable South End | Cable North End | 96 | 7′ | 1.6MV | 3.2 | 0.9MV | 50 | 2.0 | 50 | ... | |
| | 2 00 | 2.30 | 3-W | High pressure gas | Water | 97 | .. | ...... | 0.4 | ...... | ... | 0.3 | 100 | ... | |
| | 2.30 | 2.45 | 2-W | High pressure gas | Water | 97 | .. | ...... | 0.4 | ...... | ... | 0.3 | 100 | ... | |
| | 2.15 | 2 30 | 3-W | High pressure gas | Rail | Ind. | .. | ...... | 3.8 | ...... | ... | 1.5 | 100 | ... | |
| | 2 36 | 2 49 | 2-W | High pressure gas | Rail | Ind. | .. | ...... | 4.4 | ...... | ... | 2.0 | 100 | .. | |
| | . | .. | 3-W | Cable | Gas | Ind. | .. | ...... | 0.6 | ...... | ... | 0.4 | 100 | ... | |
| | ... | ... | 2-W | Cable | Gas | Ind. | .. | ...... | 0.6 | ...... | ... | 0.4 | 100 | ... | |
| | . | . | 3-W | Bell cable | Power cable | Ind. | .. | ...... | 0.3 | ...... | .. | 0.1 | 100 | ... | |
| | | . | 2-W | Bell cable | Power cable | Ind. | .. | ...... | 0.3 | ...... | .. | 0.1 | 100 | ... | |
| | . | | 3-W | Cable | Track | Ind. | .. | ...... | 2.2 | ...... | .. | 1.2 | 100 | ... | |
| | .... | ... | 2-W | Cable | Track | Ind. | .. | ...... | 2.2 | ...... | ... | 1.2 | 100 | ... | |

An accompanying illustration shows the relative location and extent of positive and negative trolley sections. It will be noticed that all the sections supplied with negative trolley have sections of positive trolley beyond and on either side and to some extent nearer the substation. With the interconnection of tracks and cross lines the over-all potential drop in any section of one polarity is small and the exchange of current from track of one polarity to track of opposite polarity is much less than by the original plan when the long lines of negative trolley extended beyond the city limits. The station output averages about 2,000 amp. with peak load of about 3,000 amp., 20 to 30 per cent of which is supplied to negative trolley.

A conception of the principle of the three-wire distribution can best be obtained by considering the accompanying illustration which assumes a total of nine cars taking 50 amp. each. With three cars operating on negative trolley in the middle of the group the over-all track drop from *D* to *A* would be that caused by 150, 100 and 50 amp. between *A* and *B*, and the gradient is always toward the station. With all cars operating from positive trolley the over-all track drop from *A* to *D* would be the result of 450, 400, 350, 100 and 50 amp., or seven and a half times the drop in the first case, assuming that the load is equally distributed and the track is all of the same resistance throughout. Furthermore, the drop from *B* to *A* in the three-wire systems will be one-quarter the drop between the same points under two-wire operation and the current returning to the plant will be one-third.

### TESTS SHOW IMPROVED CONDITIONS

After the installation had been completed for some time, a joint test was made by representatives of gas, water, telephone and railway interests to determine the difference between two- and three-wire distribution out of the Fifth Street substation. In this test one-hour graphic charts were used almost entirely, showing about half an hour's record of three-wire operation followed by about half an hour's record of two-wire operation at the same location without change of instruments or connections. This was accomplished by simply throwing the double-throw feeder switches at predetermined times.

Thirteen of the fourteen records of over-all track voltage drop to outlying points showed a reduction of

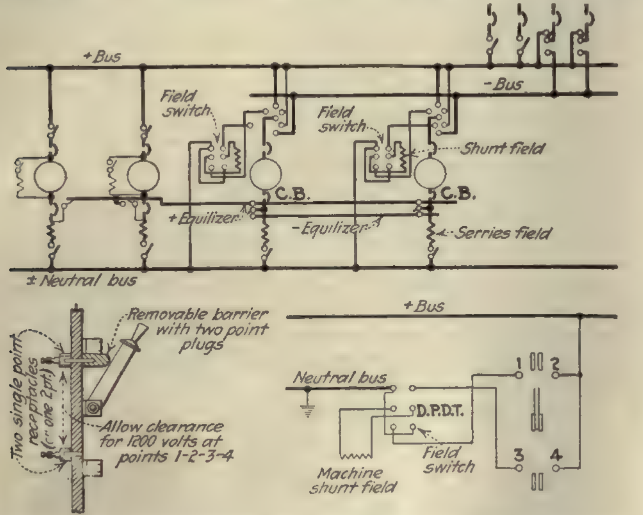
30 to 60 per cent, three records showed short-period reversals. Current flow in telephone lead-cable drainage was reduced by about 40 per cent. Current flow in power lead-cable drainage was reduced about 60 per cent, and current in the drainage of gas and water pipes was reduced about 50 per cent. In the area supplied by the Fifth Street substation current flow in underground structures was reduced from 10 to 80 per cent but in some outlying sections there were reversals of current flow varying from 10 to 30 per cent of the time. The potentials between underground structures and from structures to earth were generally reduced as would be expected. A total of about 300 graphic records were made and many readings with indicating instruments were recorded, but the former were relied upon where accurate comparisons were to be made, since they introduced the time element.

A sample graphic chart is shown in an accompanying illustration, as is also a form used in tabulating records for comparison.

### CONCLUSIONS

The three-wire distribution as first installed by making remote suburban lines operate with a negative trolley was not very satisfactory, and it would doubtless have required considerable expense to make it more effective. The negative trolley section hung approximately midway between sections of positive trolley is much better in that the average potential gradients are always toward the plant. Furthermore, a continuous gradient toward the end of the line all the time on long suburban lines with negative trolleys is objectionable.

The three-wire operation of Fifth Street substation substantially reduced over-all track potentials, current flow in underground structures, drainage currents into substation, potentials between structures and potentials between structures and earth to such values that equivalent results could be accomplished only by a very heavy expenditure for return copper or the construction of a substation to take care of suburban lines.

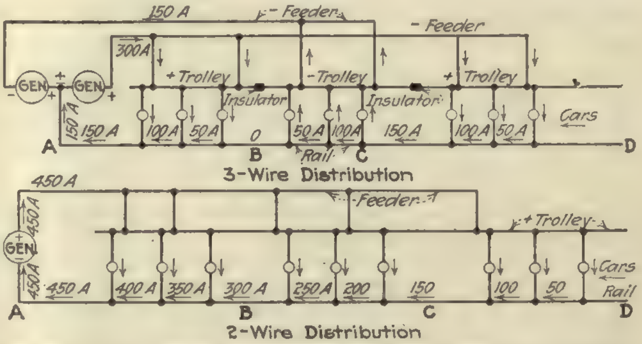


SCHEMATIC ARRANGEMENT OF GENERATORS AND SWITCHES FOR THREE-WIRE OPERATION

The operating voltage at cars, particularly at remote points in the neighborhood of junction between positive and negative trolleys, was considerably improved.

At many points a two-way voltage condition existed between some underground structures and earth or other structures, but where the positive conditions were of relatively short duration and small values it was considered that damage could not easily occur. There have been one or two locations of cable failure where these two-way voltage conditions of short duration of positive polarity exist, but since there have been cable failures where cables are continuously negative it is held that the predominating cause is something other than stray currents.

The three-wire railway distribution provides a very economical and practical plan, particularly for city districts of heavy loads where there are numerous parallel and intersecting tracks. The expense of providing the additional distribution bus and reversing the polarity of one or more machines, or its equivalent, is very reasonable. Care should be taken to have a good load factor on the machines carrying the reversed polarity. The greatest economy is derived in the saving of return copper. At Wilmington there are only about 2,400 ft. of 500,000 circ.mil return copper cable in addition to an equivalent of 1,200 ft. of 1,000,000 circ.mil cable necessary to connect the station return or neutral bus to the tracks at the two nearest locations.



DIAGRAMMATIC COMPARISON BETWEEN TWO-WIRE AND THREE-WIRE RAILWAY DISTRIBUTION

In Wilmington today the three-wire system for railway distribution from substations has been applied with success to the entire system with the exception of about 10 per cent of the load north of Brandywine Creek, which is carried by the power house and a small substation used to supply a suburban line south of the city.

## Motor Trucks in New England

UNDER the title "Root, Hog or Die; the New Englander and His Railroads," Philip Cabot discusses New England transportation problems in the August *Atlantic Monthly*. While most of the article relates to steam railroad problems, the author has quite a little to say about the competition being given to the railroads in freight transportation by motor trucks. According to him, at the present time, 2,000,000 ton-miles are being made annually by trucks in New England, and five years hence, if this growth continues, the figure will be 60,000,000. The cost of this transit in depreciated highways falls principally on the taxpayer, and 2,000 miles of highway will have to be reconstructed in Massachusetts alone during the next five years. The cost at $40,000 a mile will amount to $80,000,000. Even a tax of 10 cents a ton-mile (corresponding to about $600 a truck per year) would not cover the cost of destruction to the roads caused by these trucks. The proper agency for carrying freight in New England, in the author's opinion, is the railroad, except for distances of 6 miles or less.

# The Problem of the Fare

### Lord Ashfield in a Magazine Article Analyzes the Factors on Which Fares Should Be Based and Discusses the Relative Merits for British and American Cities of the Zone or Differential Fare

IN THE *19th Century and After* for June, 1921, Lord Ashfield, chairman of the board of directors for a number of the transportation systems in London, contributes an article of 9,000 words or more on flat and zone fare systems. At the beginning of his article he points out that London and New York present parallel features in urban transport, but that New York has the flat fare system based on 5 cents, whereas London has a differential fare system ranging according to distance from 1d. to 1s. or more. Continuing, he says, in part:

Both systems appear to have a general development of passenger traffic, and recent figures of rides per head as shown below are uncannily similar:

RIDES PER HEAD

| | 1920 | 1913 |
|---|---|---|
| London | 404 | 301 |
| New York | 421 | 352 |

The average fare in New York is just over 5 cents, whereas in London it is just over 1¼d. or about a half. In 1920 investigation of financiers and experts in New York indicated that 8 cents was necessary, and in London the figure was nearly 3d. This raises the issue of the comparative merit or demerit of the contrasted systems of fares. The subject will be discussed under four heads, namely: (1) The fare as the index of the value of the service received; (2) the fare as the index of the value of the service rendered; (3) the fare in relation to the cost of service, and, finally (4) the fare in relation to public or civic policy.

If persons live scattered around in suburbs and work in the center of the city and each day are carried to and from their work, the value of the service received by each of them may be said to be identical. It is not of any more real value to be carried 5 miles than 3 for this necessary purpose. In fact, the travel is often a bother, and the time occupied is an expense. Is it therefore reasonable to add to the expense by charging a higher fare? There in brief is the economic argument which leads to the flat fare—one price for all rides. But though the bare service received by the passenger may be identical in value for all, the effects of the service are dissimilar, and, overlooking for the moment other considerations, the real value might just as well be reflected in the fare as in the rent or rates. For instance, in London the rent for equivalent accommodations normally falls as the center is left. In New York it is reported that the rent for the same accommodations in upper New York is the same as in lower New York and that the accommodation is the same.

The flat fare of America is the consequence of an accidental circumstance, the denominations of the coinage. The smallest effective coin in constant use in England is a penny. In America it is the nickel. This disparity in value at the very starting point of a fare system must be a governing factor in the development. In England a differential fare scheme must start with a penny as its initial fare and the question is: What is a fair pennyworth of travel? In the small cities it was found that the cost of the average length of journey taken in them was amply met by the collection of a penny from every passenger. In the larger cities, where the distances to be covered were greater, the penny was insufficient, and as the penny was deemed the indispensable starting point for a fare system, additions were made to it for the further distances, and the differential fare became inevitable.

In America the same question was presented except that it was: What is a fair nickel's worth of travel? Apart from the recent breakdown of the 5-cent fare owing to the war, there were cases in which the extension of the cities had already proved too great a strain upon it. In Chicago and New York (1916) the length of journey had reached 6½ and 5¾ miles respectively on the elevated and subway lines, while on the street railways it exceeded 4 miles, and revision in some form could not long have been avoided. Would American practice follow English practice and from the initial flat fare develop as required fares at higher rates for the extending routes of street railways?

The 5-cent flat fare having prevailed for so long a period and the development and extension of the cities having taken place under the conditions established by it, it has become the ingrained custom for America. The greatest resistance is shown to the introduction of the zone or differential fare. It is realized that it must mean alterations in land values and property values, distribution of population, decentralization of the city and the creation of local centers of activity and amusement. Every vested interest is opposed to it. It is a change of a revolutionary character. Therefore America struggles to keep the flat fare, and it has disappeared in favor of a zone fare system in thirteen cities only.

The question of giving change is also a consideration. No one cares for odd cents.

When a flat fare reaches a level of 10 cents its acceptance must be held to indorse the principle that every ride, irrespective of length, is the performance of service of equal value to every rider. But as a measure for expanding the volume of traffic to the utmost it cannot be sound. Surely some must pause and reflect on the value of the service to be received before paying away their dimes for a brief journey. There is interesting confirmation of this in the average carloads of American and English street railway systems. In spite of the fiercer temporary congestion in American cities, the average carload on an English system is about half as heavy again as on an American system. This is the refreshing fruit of the low initial fares which induce casual riders at all hours of the day. In Berlin also an increasing flat fare has driven away passengers. In contrast with this the underground railway of Berlin, which had a differential fare scheme based on the number of stations covered by the journey, has at least been able by more flexible adjustments of its fares to maintain itself in a solvent condition. There is a narrow upward limit to a flat fare. It tends to disaster where this narrow limit is exceeded. It depends for its validity upon the principle that all journeys are of equal value to the passengers. As soon as the passengers become conscious of a difference in the value of the rides received they become willing and anxious to recognize a difference in the fare paid. In fact, they are found to insist upon a system of fares which commends itself to them as equitable before they will ride freely.

### THE FARE AS THE INDEX OF VALUE OF THE SERVICE RENDERED

The nature of the service rendered in general is the passenger-mile, so that the observation of this principle demands a system of differential fares increasing with distances covered. At the outset, however, a distinction must be drawn between a zone system and a differential system of fares. A zone system of fares defines a series of areas and establishes a rate of charge for each area. The fare paid for a journey across several areas is the sum of the charges applicable to those areas. An intending passenger near to the boundary of an area is induced to walk to the boundary to save one of the charges. This feature has been noticeable in American cities where outer zones have been added to the initial 5-cent central zone at a charge of 2 cents per zone covered. It is a common defect in a zone system that the fares are not overlapped. This inequity is the mistake which has spoiled and wrecked so many of the ventures into zone schemes in America.

The differential system of fares is based upon stages, being the distances between station and station, or between point and point used in defining the fares. At any point there is a complete system of fares for that point in relation to every other point, and the points are usually of such a number that for each rate of fare there is a choice of two or three as destinations in every direction.* Thus the fares are always flexible and capable of fare adjustments to the total distance covered wherever the passenger starts or finishes his journey. This is the system of fares to which experience has always tended in this country [Great Britain]. Whatever experiments there may have been with flat fares, as when the Central London Railway was the "twopenny tube," they have uniformly broken down into a differential fare scheme, and the financial results of the change have been uniformly beneficial.

As already explained the 1d. fare is the dominant fare here, and every scheme of fares must, at any rate before the war change in price level, have taken it into account. It was too low a unit on which to found a flat fare system. Thus, as soon as journeys exceeded a length of 2 miles on the average, the higher fares were secured by additions to the 1d. for the further distances. Table I shows the rates of fare and number of passengers carried at each rate of fare for the three principal agencies of passenger transport in London in 1913.

TABLE I—SHOWING PASSENGERS (LAST 000 OMITTED) AT DIFFERENT RATES OF FARE IN 1913 ON LONDON TRANSPORTATION SYSTEMS

| Ordinary Passengers | Underground Railways* | Per Cent of Total | Motor Omnibuses | Per Cent of Total | L.C.C. Tramways | Per Cent of Total |
|---|---|---|---|---|---|---|
| Number of passengers carried at fares of: | | | | | | |
| 1d. or less | 22,376 | 33 | 464,933 | 69 | 368,714 | 86 |
| Over 1d. up to 2d. | 30,412 | 46 | 148,035 | 22 | 51,229 | 12 |
| Over 2d. up to 3d. | 12,814 | 19 | 43,462 | 6 | 6,717 | 2 |
| Over 3d. | 997 | 2 | 19,898 | 3 | .450 | .. |
| Total | 66,599 | .. | 676,328 | .. | 427,110 | .. |
| Average fare paid per ordinary passenger | 1.8d. | .. | 1.3d. | .. | 0.9d. | .. |

*London Electric and Central London Railways only. Other records not available in detail.

The percentages reveal the relative importance of the different fares. The question whether the same number of people would have paid the average fare as a flat fare is the test of the soundness of the policy. All the available evidence is against the proposition. Almost every change in fare made in London over the decade that preceded the war has shown as its immediate results something approximating to the same gross receipts. The passengers rose or fell in numbers as the fare fell or rose in rate. The product was little altered. When, however, the upward change in fare was justified, the volume of traffic at the new fare was not checked except temporarily, but soon continued to rise again with the general growth of travel.

The critical argument in favor of the differential fare may be studied in the case of the halfpenny fare conducted on the chosen ground of Glasgow. While the average expenses and charges per passenger carried never fell below 0.70d., as much as 64 per cent of the total number of passengers carried were being charged no more than a halfpenny. In the last full year of their currency the number of passengers at halfpenny fare was 305,000,000. Ten years earlier it was 62,000,000. The expansion of traffic had been sensational and warranted their introduction. The passengers were created from those who previously had walked on account of the 1d. fare. The footwalks were cleared of pedestrians and the vacant seats in the tramcars filled. So long as there were vacant seats in the tramcars it was expedient to fill them at any price, for every passenger brought in helped to pay a share of the cost of operation and so averaged them down to a smaller sum per passenger. The Glasgow halfpenny fares were withdrawn on May 31, 1920, when they had become uneconomic in reality as well as in appearance.

A converse illustration is the introduction of the cheap midday fare of 2d. on the London County Council Tramways. The motor omnibuses were compelled to follow the practice in self-protection. The results for the motor omnibuses was that in a week 198,000 passengers used the cheap tickets, represented in part by passengers already riding at the ordinary fares and therefore gaining by the special cheap fares, and in part by further passengers induced to ride by reason of the cheaper facility. The loss on the former passengers is estimated at £9,500, the gain on the latter passengers is estimated at £8,750, so that the ultimate loss is £750 a week. Here the abandonment of the differential fare over 2d. led to a diminution of earning power because the especially attracted traffic was insufficient to balance the reduced earnings from the existing traffic.

So far all the evidence shows that the settlement of a scheme of fares on the basis of the value of the service rendered is generally approved and leads to the creation and retention of the maximum volume of traffic. This feature is a most important argument in favor of the differential fare. The short distance traffic, which a differential fare system encourages, is ordinarily casual traffic, arising not at the times of peak load when the change-over from home to business or business to home is taking place, but throughout the day. It occupies the vehicles when they are more nearly empty and it is turned over quickly, one passenger succeeding another and occupying the same seat. It must have been a misguided transference of these characteristics of short distance traffic which led up to the cheap midday fare for long distance traffic, for a little reflection shows they are not applicable. Long distance traffic is not casual, it moves with a purpose and therefore is not stimulated by cheapness to a satisfactory extent. It also persists in occupying the seats, for it cannot be turned over. Finally, a differential system of fares seeks a satisfactory average fare over all passengers, and if fares are introduced below this satisfactory average on the one side, they must be balanced against fares above this satisfactory average on the other side.

The strongest case for the differential fare has resulted from the general advance of all fares consequent upon war conditions. To make, as in America, an initial charge of 7, 8, 9 or 10 cents per ride is obviously a depressing treatment for traffic. As the desired average fare gets higher, it becomes more surely convenient and politic to reach this average by actual fares both above and below it. Table II gives the results for the revision of fares on the Underground Railways in September last and is based upon an analysis of the local ordinary traffic for a week in September, 1920 and 1921.

TABLE II—SHOWING EFFECT ON TRAFFIC OF FARE INCREASE, LONDON UNDERGROUND RAILWAYS

| | February, 1920 | | February, 1921 | | Loss | |
|---|---|---|---|---|---|---|
| Passengers Carried | Number (1) | Per Cent of Total (2) | Number (3) | Per Cent of Total (4) | Number (5) | Per Cent of Total (6) |
| Over one station distance | 171,370 | 6 | 117,689 | 4 | 53,681 | 31 |
| Over two stations distance | 423,934 | 14 | 325,864 | 12 | 98,070 | 23 |
| Over three stations distance | 431,478 | 14 | 396,093 | 15 | 35,385 | 8 |
| Over four, five and six stations distance | 1,074,465 | 36 | 991,222 | 37 | 83,243 | 8 |
| Over more than six stations distance | 906,956 | 30 | 839,857 | 32 | 67,099 | 7 |
| Total | 3,008,203 | .. | 2,670,725 | .. | 337,478 | 11 |

The table shows two inter-related but expected features. First, that the longer the journey taken the smaller the percentage loss in traffic. The percentages in the last column fall steadily. Second, that the higher the fare the larger the proportion of long distance traffic carried.

### THE FARE IN RELATION TO THE COST OF SERVICE

The third principle which might govern the determination of a scheme of fares is the cost of service. In practice it runs so nearly parallel with the value of the service rendered, unless the circumstances are exceptional, that there is a chance of the two aspects not being clearly distinguished. An analysis of costs shows that there are some charges, like terminal and overhead expenses, interest, rentals, reserves, and fixed charges, which properly may be divided equally among all of the passengers carried. Another set of expenses are those concerned with the running of the cars, and these may properly be proportioned to the passenger-miles run. An analysis of costs, as applied to the tube railways in London, shows for 1913-1915 a total initial charge per passenger of 0.95d. and in 1920 1.25d. and for the train working and track expenses per passenger mile, for 1913-15, of 0.20d. and for 1920 of 0.40d. A comparison between the scale actually adopted for ordinary fares in the recent revision and the theoretical scale based on this analysis is set out in Table III.

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*[EDITORS' NOTE—In other words, fares are not determined by fixed zone lines but by the distance traveled by the passenger.]

TABLE III—SHOWING THEORETICAL AND AGTUAL SCALE OF FARES

| Theoretical Scale, d. | Distance Not Exceeding, Mile | Actual Scale, d. |
|---|---|---|
| 1.85 | 1 | 1.50 |
| 2 15 | 1½ | 2.00 |
| 2.75 | 2½ | 3.00 |
| 3.35 | 3½ | 4 00 |
| 4.25 | 5 | 5.00 |
| 5.15 | 6½ | 6.00 |
| 6.05 | 8 | 7.00 |
| 7.25 | 10 | 8.00 |
| 8.45 | 12 | 9.00 |

There could hardly be a closer approximation between theory and practice. It will be seen that the scales commence with a moderate initial charge and that as the distance increases the addition grows less in proportion. It gives a flattening effect with the accumulation of miles but never becomes wholly flat. The rate per mile charged to passenger regresses with each mile of the journey. Such a scale corresponds intimately to the value of the service rendered and bears fairly on the passenger. It has public advantages in relaxing the burden for the outlying suburbs and so encouraging the spread of population. This flattening out of the fare scale is an intermediate state between acutely differentiated fares and flat fares.

Already the public or civic relationship of a fares policy has been anticipated, but it is not possible to omit them from regard for long. It is a matter of serious regret that fares have become a political issue. Maybe it is safer to discuss America than London. The 5-cent flat fare was an excellent opening for the transport agency. It was exceedingly remunerative, readily paid and effective in spreading out the town beyond walking distance. When a change was needed to maintain the credit and efficiency of the transport agency, it was bitterly resented. A big American city is a single unit. It has a theater center, a shopping center, a business center and all traffic converges upon these unique spots. The flat 5-cent fare encouraged this. The zone fare has the opposite influence. It tends to decentralize. As soon as it costs more than 5 cents to reach what is wanted, the time has arrived when that which is wanted must move and disperse. It is an educative contrast to survey a big American city and London. London is a place of submerged towns, but though they are submerged they are not lost. The differential fare has been their safeguard and prevented Westminster, for all its magnificence, entirely obliterating them.

It is said that the flat fare prevents congestion of the population on an urban site, but are American cities any less congested than English cities? Boston, Mass., for instance and Birmingham are alike in density of population, so are Cleveland, Ohio, and Sheffield. Brooklyn matches Manchester; Manhattan equals Bethnal Green or Shoreditch, Southwark or Stepney. There is nothing to choose. The city of Paris proper, which, almost unique among European cities, has a flat fare, is the most congested of all.

From a public point of view the most significant measure of success attaching to a scheme of fares is the enlargement of the habit of travel. Freedom of movement is the essential condition of healthy urban lines. In New York and London this is assured. Every citizen—man, woman or child—travels on the average over 400 times a year. It is hard to realize what a vast accomplishment this is. The mere time consumed must be a goodly slice of life. And all those journeys have to be paid for. They represent for London, in a typical family of five, a sum of more than £16 out of the family income, four weeks' pay for a workman. Yet it is cheap. Free movement results in a growing sense of solidarity.

In conclusion, while there would appear to be a favorably balanced argument for the differential fare, sufficient has been said to show that there can be no dogmatism about a theory of fares. There is certainly not one fare scheme adaptable to all urban conditions. The information used for this article was collected in the study of the specific problem of fares for London, and it is hoped that it may lead to the right scheme of fares being adopted. Similar studies would lead to similar right solutions for other cities, and this article sketches a line or lines of approach to the problem of fares.

## Safety Cars Make Good in Oakland

ON DEC. 1, 1920, the San Francisco-Oakland Terminal Railways substituted ten standard Birney safety cars for five two-man cars on a route in Oakland. These cars operate over eight blocks on Broadway, Oakland's principal business street, on a short run between Seventh Street and Broadway and Alcatraz Avenue and are sandwiched in between larger double-truck, two-man cars on long through runs.

Over these eight blocks there are nine other car lines averaging 182 cars per hour, as well as four intersecting car lines, with the crossings under the control of traffic officers. On these four intersecting cross streets there is a total service of 170 cars per hour. Broadway also accommodates a very heavy movement of automobiles in both directions as well as a large amount of cross traffic from the side streets.

COMPARATIVE RESULTS OF SAFETY CAR OPERATION—OAKLAND, CAL.

| | 10 One-Man Cars April, 1921 | *vs.* 5 Two-Man Cars Nov., 1920 | Increase or Decrease | Per Cent Change |
|---|---|---|---|---|
| Car-miles operated | 30,534 | 15,262 | 15,272 | 100.00 |
| Per car-mile: | | | | |
| Receipts | 25.01c. | 33.80c. | *8.79c.* | *26.0* |
| Expenses—Platform | 7.42c. | 11.05c. | *3.63c.* | *32.8* |
| Power | 1.72c. | 4.65c. | *2.93c.* | *62.9* |
| Net receipts* | 15.87c. | 18.10c. | *2.23c.* | *12.32* |
| Seat-miles | 977,092 | 610,478 | 366,614 | 60.0 |
| Seat-miles per car-mile | 32 | 40 | *8* | 20.0 |
| Per 100 seat-miles: | | | | |
| Receipts | 78.17c. | 84.49c. | *4.32c.* | 5.12 |
| Expenses—Platform and power | 28.56c. | 39.25c. | *10.69c.* | *27.20* |
| Net receipts* | 49.61c. | 45.24c. | 4.37c. | 9.67 |
| Power consumed at 1.409 cents per kilowatt-hour | 37,282 | 50,364 | *18,082* | *26.00* |
| Power consumed per car-mile | 1.22 | 3.30 | *2.08* | *63.0* |
| Revenue passengers | 127,294 | 85,970 | 41,324 | 48.0 |
| Revenue and transfer passengers | 154,432 | 104,208 | 50,224 | 48.2 |
| Passengers (all kinds) per c-m | 5 07 | 6.84 | *1.77* | *25.9* |
| Load factor—per cent use of seats | 15 82 | 17.12 | *1.30* | ...... |

* After deduction of platform and power expenses only.

Through this maze of traffic the movement of safety cars has been accomplished without delay, inconvenience or accidents, and the results, as shown in the accompanying table, indicate that with 100 per cent increase in cars operated and 60 per cent in seat-miles the receipts have increased 48 per cent, although the number of seats per car has decreased 20 per cent. An analysis based on the car-mile as a unit of comparison indicates receipts decreased 26 per cent and that net operating revenue after deducting power and platform expense (all others being considered unchanged) decreased but 12.32 per cent, indicating in reality a gain of 13.68 per cent in favor of the safety car.

On a seat-mile basis due to a traffic gain of only 48 per cent the receipts are still 5.12 per cent off, even though platform and power expenses show a reduction of 27.2 per cent. The benefit from the change, however, is more clearly reflected in the gain in net operating revenue, which amounts to 9.67 per cent.

# Bus or Retrack?

## A Study on the Place of the Motor Bus, Particularly in Cases Where the Existing Traffic on Electric Railways Is Not Sufficient to Justify New Rail and Continuance of the Paving Burden

BY WALTER JACKSON
Consulting Engineer

DURING the early spring of 1921 the writer had occasion to consult for the J. G. Brill Company and others on a number of situations where the motor bus is well adapted to supplement and even supplant the electric car with advantage to the operating company.

One of these is where a high-voltage interurban railway is required by ordinance to make stops for local passengers in one of the towns through which it operates. No city car for the voltage used is practicable, so that the suggestion has been made that the local traffic be handled by motor bus. Such a plan would not only relieve the interurban cars of an unprofitable class of traffic but by cutting out these local stops would increase the scheduled speed of the interurban cars. In this instance it is merely a question of determining whether there are enough local city riders along the interurban route to make a separate bus line worth while. Unlike the following cases, this situation has not yet been analyzed in detail.

### SITUATION 2—CROSSTOWN ROUTE ON M STREET

A second and far more important case is that of a large Eastern electric railway which had a number of situations involving the alternative of motor buses, for retracking or for extensions of existing lines. One was a tie line (situation 2, M Street) with a double track 1.1 miles of route in length, connecting two trunk lines. Most of the traffic consists of passengers who transfer to or from one of the intersecting trunk lines. During the greater part of the day the cars on this 1.1-mile route are operated as shuttles, but during the usual peak hours a certain number of cars are through-routed over this line from one of the two trunk lines, though at large expense. The question of the future of this route, which has never been profitable, came up through the decision of the city to repave the street. As the railroad was subject to the usual paving burden, a renewal of the trackway and paving for 18 in. each side of the rails, the cost* would have been as follows:

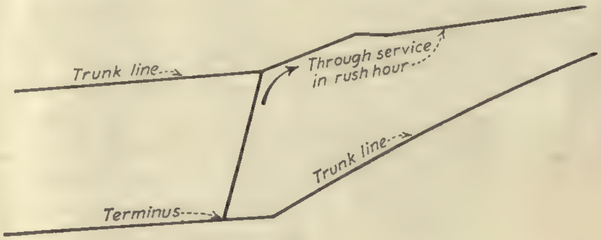
| | |
|---|---|
| IF DOUBLE TRACK | |
| Track labor and material | $72,372 |
| Paving labor and material | 19,278 |
| Total | $91,650 |
| IF SINGLE TRACK | |
| Removing one track and repairing and relocating the other track in center of street | |
| Track labor and material | $49,342 |
| Paving labor and material | 11,428 |
| Total | $60,770 |
| Net cash cost of removing track poles and overhead if track service is abandoned | $10,396 |

An analysis showed that only 1,700 passengers (850 each way) made use of this route on business days. Of this number 1,100 were through-route (3.4 miles) rush-hour riders and the rest were transfer passengers. The headway during non-rush hours was fifteen minutes and during rush hours was seven and one-half minutes. Only 62,400 car-miles were run on the 1.1 mile section of this route during a year. The cost of the proposed investment in track and paving ($91,650) at 8 per cent would amount to $7,332 per year, which would be equivalent to 11.7 cents per car-mile.

On the other hand, it was estimated that one twenty-five-seat all-steel bus at $8,000 with one as reserve would do the same shuttle service. As the factor of cost of removing old track, etc., would be the same whether bus or car was used, the relative capital requirements worked out as follows:

| | Buses | Cars |
|---|---|---|
| First cost as described | $16,000 | $91,650 |
| Fixed charges per year with 62,400 vehicle-miles (cents) | 2.1 | 11.7 |
| 74,000 vehicle-miles (cents) | 1.7 | 9.9 |

The cost of operation (for a two-man car) was 35 cents per car-mile. The expenses of the bus on the basis of a useful life of the bus of 100,000 miles and a gasoline consumption of 6 miles to the gallon worked out as follows:



Situation 2

OVER-ALL COSTS PER BUS-MILE

| | Cents |
|---|---|
| Interest on investment | 1.7 |
| Depreciation, 100,000-mile life | 8.0 |
| *Conducting transportation | 12.0 |
| Maintenance of equipment, except tires | 4.0 |
| Repairs and renewals pneumatic tires | 5.0 |
| Gasoline and lubrication | 5.5 |
| Garage inspection and general license fees, insurance | 3.8 |
| Total | 40.0 |

*This item is very high because of the long layovers on this particular route and because the wages were figured as two-thirds instead of one-half the car wages. On routes with more revenue-miles per hour, as on fairly long runs, this figure would be 10 cents or less.

In other words, the bus would cost 40 cents per vehicle-mile as against 45 cents for the cars. With a larger number of buses certain of these figures could be reduced appreciably. It should also be remembered that the great advantage of the motor bus to the electric railway in instances like these does not lie so much in the annual savings as in the release of large sums of money for more productive purposes than the retracking and repaving of unimportant car routes. If, as occurred in this case, the proposal to supersede track by motor bus operation leads to a proposal to eliminate paving and other burdens if the track is retained, so much the better. The progressive management cannot lose either way by any plan that puts the two methods on a fairer basis of comparison.

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*NOTE: All figures were prepared during the winter of 1920-21 and early spring of 1921. Present costs of both track and bus are lower, but it has been thought wiser to make no changes from the figures in the original reports.

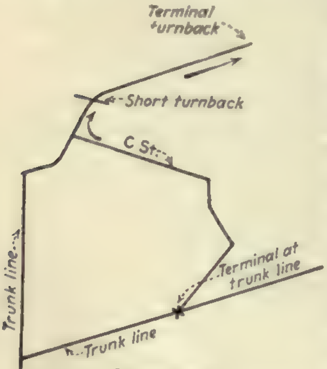
### SITUATION 3—ANOTHER CROSSTOWN ROUTE

Situation 3, which may be called A Street, resembles the M Street situation in being a cross connection between two trunk lines. However, it is only 0.6 mile long and almost all of its traffic flows toward one of the trunk lines mentioned. Through service is given, but as the distance to the trunk line is short and as the through cars on this route take a rather circuitous route in going to the city most of the residents of this district walk to one or the other of the trunk lines when going to the business district. When the time approached for retracking and repaving the estimates proved to be as follows:

Estimate of cost for rebuilding existing double track with 7-in. girder rail, repaving with recut granite, grouted joints and concrete base on A Street

| | | |
|---|---|---|
| Special work for turnout | | $2,000 |
| 6,500 ft. 7-in. girder rail | | 22,750 |
| 3,325 treated ties | | 6,650 |
| 6,650 ft. track laid ready for paving, stone ballast | | 13,300 |
| Teaming, watching, etc | | 2,500 |
| Removing 6,650 yd. existing granite paving | $2,660 | |
| Removing 6,650 yd. existing track | 1,665 | 4,325 |
| | | $51,525 |
| Plus 20 per cent | | 10,305 |
| | | $61,830 |
| Less credit for scrap material | | 3,990 |
| | | $57,840 |
| Add | | |
| 266 M recut granite blocks | $5,320 | |
| 6,650 sq.yd. concrete base, furnished and laid in track and brows, teaming, etc | 9,975 | |
| 6,650 yd. paving, ditto | 9,310 | |
| | $24,605 | |
| Plus 20 per cent | 4,921 | $29,526 |
| Total cost | ....... | $87,366 |
| Alternative estimate covering five-year rehabilitation for same location | | $72,800 |

A factor which affected the situation was that this part of A Street was a vital part of the positive and negative feeder distribution system, serving as a tie between two operating districts. Therefore, if the rails, trolley wires and feeders were removed because of bus operation, it would be necessary to furnish equivalent copper at an estimated cost of $11,000.



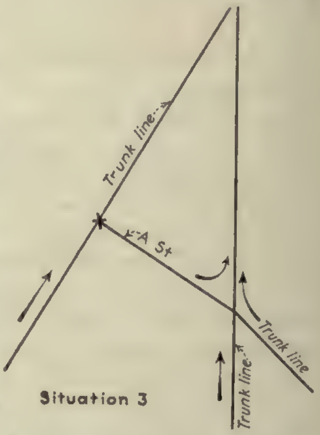
Situation 4

Examination of the operating statistics showed that the number of car-miles run on the 0.6-mile section of A Street was but 40,000 a year, or 114 miles per week day. The normal headway was fifteen minutes and the rush-hour headway ten minutes. Only 500 people a day used the service within this part of the run. Consequently two buses during the rush hours and one bus during the other hours would meet all shuttle service requirements. The relative over-all cost was then worked out as follows:

| | | |
|---|---|---|
| Cost of track and paving renewals | $87,366 | |
| Investment charge on same at 8 per cent a year | 7,200 | |
| Investment charge per car-mile operated, on basis of 40,000 car-miles per annum | | 18 cents |
| Although this route is run with safety cars, this tremendous increase in overhead would make the over-all cost per car-mile at least | | 45 cents or $18,000 |
| The outside cost of two twenty-five-seat all-steel buses at $8,000 each, plus $11,000 for new feeders and $7,718 net cost of track removal, is in new money | $34,718 | |
| Or per bus-mile (40,000 miles) per annum | | 8 7 cents |

Assuming twenty-five-seat motor bus operation to cost, say, 45 cents, instead of 40 cents per bus-mile because of unusually high overhead to be charged against it, we still break even. In this case, then, the railway would have to find only $34,718 instead of $87,366 in new money, the difference being made available for more productive uses than retracking and repaving this kind of location.

It has been stated that this route actually handled more passengers en route on the overlapping section of its run than it did in its own territory. So the question arises as to how to take care of these strictly trunk-line passengers. Inasmuch as this trunk line is already served by two routes, it was suggested that, instead of shortening the A Street route, it be abolished entirely, because any extra carrying capacity desired could be obtained by running somewhat larger cars and some more mileage on the two regular trunk-line routes or on only one of them.



Situation 3

Without going into detailed explanations, it may be stated that the net result of eliminating the A Street route entirely would be to save 99,000 car-miles per annum, the difference between the 160,000 miles actually run on the overlapping section and the 61,000 car-miles which would have to be added to one of the trunk-line routes. At 45 cents per car-mile the saving of 99,000 car-miles would be $44,500 per annum.

Thus this particular study developed a condition where the replacement of cars by buses makes easier the elimination of wasteful, overlapping mileage, and so leads to greater savings than if no rerouting, but simply a direct replacement of car by bus, had been considered.

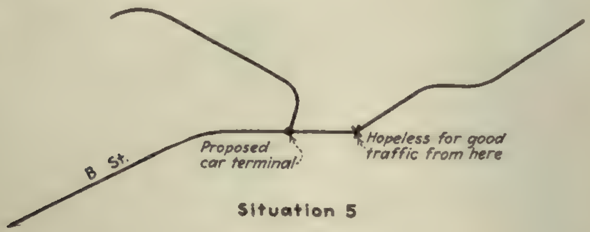
It may be of value to add that if the buses were to duplicate the present A Street route for its full length the result would be a loss instead of gain, even after taking into consideration the track reconstruction cost of part of the route as detailed.

### SITUATION 4—ANOTHER EXAMPLE OF REDUCING LOSSES

Situation 4 (C Street) relates to a third type of cross connection through almost desert territory. The round-trip runs are 4 and 3 miles respectively, according to where cars are turned back on one of the trunk lines intersected. Only ½ mile or so of the cross-connection is built up and paved, the rest of the run passing through swamps and an oil and gasoline storage district that offers no hope for future traffic development. Through this section the only paving is the granite strip put down by the railway and used cheerfully by all the tank motor trucks going to and from the storage district. The city will have to pave all of this road sooner or later. The two-man cars on this route operate only 99,000 car-miles a year, with an average of only 1.05 revenue passengers per car-mile. Even with the inclusion of transfer passengers, there are less than two passengers per car-mile. The crew expense alone is more than double the total revenue. On a typical week day 300 car-miles were run for 491 patrons.

In place of the 99,000 car-miles per annum, it has been suggested that the company operate 72,000 bus-miles, giving an equivalent service on C Street itself, namely, 2.7 miles round trip, instead of running up any part of one of the intersecting trunk lines. A twenty-five-seat bus would be more than ample, and two of this size would be enough to maintain the present fifteen-minute headway.

The only investment items chargeable against the motor bus in this case comprise the price of two twenty-five-seaters, say $16,000, and the eventual charge of $11,000 for replacing the rail return with other negative feeder—a total of only $27,000 new money, of which it would not be necessary to use more than $16,000 at once. Because of the conditions obtaining on this street, the rail might remain in place purely as a return circuit until such time as the street is repaved.



Situation 5

In contrast with this sum, the $27,000 new money that bus operation would entail (aside from eventual removal cost of track, etc.), is the company's way department estimate that the cost of retracking and repaving of this 8,400 ft. double track would amount to a total of $160,000.

### SITUATION 5—POSSIBLE ELIMINATION OF UNPROFITABLE EXTENSION

This case differs from the foregoing in that it relates to the possibility of replacing a thin-traffic terminal section by means of a motor bus shuttle instead of paying heavy expenses incident to the widening of a street. The portion to be widened is practically one-quarter mile long and is in good territory, but the district for the remaining 0.85 mile of this route is hopeless from a traffic standpoint for topographical reasons. It is therefore a question as to whether it would not be more economical to terminate the car line at the point where the street widening is to begin and to handle the trifling traffic for the 1.10 miles beyond by means of a shuttle bus.

For convenience, the whole route may be referred to as B street. On inquiry it was found that if the track and line on the last 0.85 mile were removed now the company would have to spend $15,410 net owing to the requirement of restoring the paving, but if it waits until the paving is renewed in the course of time by the city the net outlay would be only $1,460. To summarize the actual cash outlay in each proposition, it was determined that the company must either lay out at once $29,934 cash for the street widening project or pay $14,000 for two sixteen-seat buses plus $1,460 at some time in the future.

As regards the number of people to be served by the buses on the last 0.85 mile, the "on and off" traffic records showed that out of 540 outbound riders on a business day, 240 were in the first quarter mile and but 180 in the last section of 0.85 mile. Of inbound riders, only 224 got aboard in the 0.85-mile section and 326 in the quarter mile adjoining the proposed terminus of the shortened car line. This traffic, or even twice as much, could be handled with one bus during the off-peak hours. A second bus could go on for three, four or more hours as experience would dictate.

In view of the few stops required, the single bus used all day should make four round trips of 2.2 miles each, or 8.8 miles an hour, readily. It, or the relief bus, would make, say, 160 miles a day or 58,400 miles per annum. With rush-hour supplementary mileage, the total might be placed at 65,000 bus-miles per annum in place of the 60,823 car-miles it was suggested to remove. The comparative costs would then work out as follows:

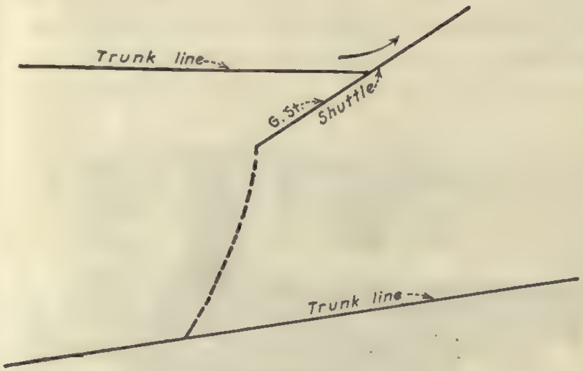
| | |
|---|---|
| 60,283 car-miles at 45 cents per car-mile | $27,127 |
| 65,000 bus-miles at 40 cents per bus-mile | 26,000 |

Even if the cost of car operation over all, because of safety car service, is taken at 40 cents, in contrast with the 50 cents over-all cost of the whole system, car operation would still cost as much as bus operation per vehicle-mile. Should the bus operation be debited $15,410 for removal of track and line, etc., the added investment charge of $1,233 would be on the basis of 65,000 miles a year operation, or only 1.9 cents. However, in practice, a higher bus cost might not appear at all because of the high figures assumed for small-number bus operation in these estimates.

### SITUATION 6, G STREET—BUSES FOR A "ONCE-WAS" TRACKWAY

Once upon a time, as in the fairy stories, a suburban railway system had come into the city's outer territory via 1.3 miles of open track construction to make a cross-town route long before there was any semblance of a town in that territory. Eventually, 0.46 mile of this 1.3 miles was taken up. Today the district is still sparsely settled, but the dwellings already built give promise that it will be a high class suburb within the next two or three years.

The city now intends to pave what we will call G Street for the entire 1.3 miles, including the 0.8 mile vestigial track operated by the city railway as a safety car shuttle. The cost of extending this shuttle 0.46 mile so that it will intersect with a trunk line at each end plus the cost of paving obligations works out as shown in the following statement:



Situation 6

NINE-INCH GIRDER RAIL CONSTRUCTION

No ballast unless actually required, concrete paving base and 5-in. grouted blocks with granite joints:

| | |
|---|---|
| Trackwork | $25,710 |
| Overhead construction | 2,700 |
| Paving and base | 14,500 |
| | $42,910 |

From a study of the traffic statistics, the following set-up was derived:

COMPARISON CAR VS. BUS, G STREET

| | |
|---|---|
| Present car operation, fifty-three round trips of 1.624 miles each daily | 86.1 miles |
| Annual car-miles | 31,426 |
| Passengers carried on weekdays, approximately | 200 |
| Cost of future operation if line is extended to other trunk line, making the round-trip distance 2.54 miles. | |
| Annual car-miles on basis of three round trips an hour and 2.54 miles per round trip, approximately | 50,000 |
| Cost of the extension (0.458 mile) would be | $42,910 |
| 8 per cent annual investment charge on this extension would be | $3,432 |
| Which is equivalent on 50,000-mile operation to a fixed car-mile charge of | 6.8 cents |
| The investment charge per car-mile on two $8,000 buses at 50,000 miles would be | 2.56 cents |
| The over-all coet of 50,000 car-miles at 45 cents per car-mile would be | $22,500 |
| The annual over-all cost of operating these buses would be 40 cents × 50,000, or | $20,000 |
| Saving through motor bus operation, per annum, approximately | $2,250 |

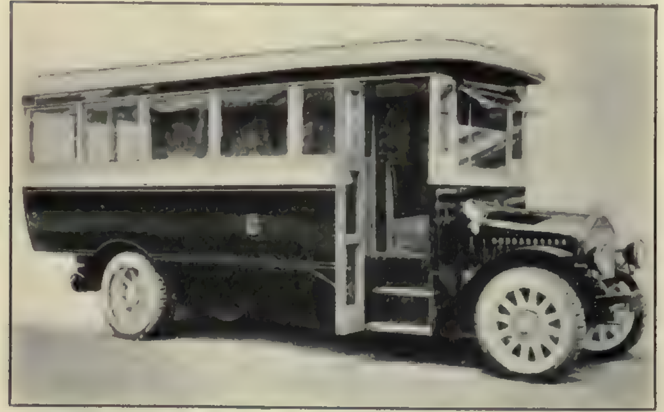
In conclusion, it may be pointed out that when the original full-length route was in operation the passengers, few as they were, insisted upon through service so long as they saw a track connection. Should motor buses be operated, shuttle service will be considered a matter of course, thus preventing the return to wasteful, through operation.

# Bus Route for Pennsylvania

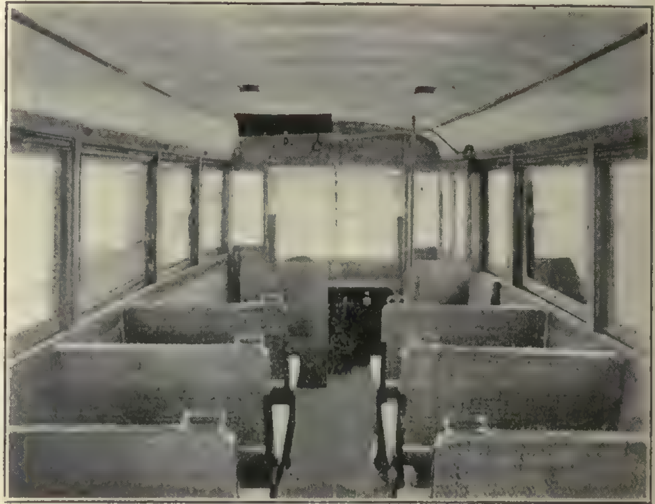
**Traction Company Finances Supplemental Motor Bus Company to Operate Between Oil City and Franklin to Meet a Popular Demand—Operation Started July 15**

A RATHER interesting motor bus service supplementing existing trolley lines was inaugurated on July 15 by the Citizens Transit Company with a twenty-five-passenger Mack-Brill bus.

The Citizens Traction Company furnishes local and interurban service in and between Oil City and Franklin, two cities 8½ miles apart on the Allegheny River in the northwestern part of Pennsylvania. The entire country between these two cities is very mountainous, and on account of the rugged contour the electric railway company found it necessary to follow the ravines and valleys to find an operative grade. This made necessary a line 12 miles long in order that through service might be furnished between these two cities. The shortest route, however, lies along the banks of the Allegheny River, and there was at one time a line connecting the two cities along the north bank of the river. However, for 1½ miles of this distance the hills rise abruptly from the riverbed, so that the electric railway lines necessarily had to be built on heavy grades, a construction which proved to be exceedingly difficult and operation so hazardous that service on this 1½-mile link was ultimately discontinued. This left two short routes, one between Oil City and Reno Village and the other from Franklin east to Rocky Grove.


EXTERIOR OF MOTOR BUS, SHOWING INCLOSED STEPS OF CONVENIENT HEIGHT

In December, 1920, a concrete highway constructed on an easy grade was completed from Reno Village to Franklin, a distance of 4½ miles, on the north bank of the Allegheny River. With the completion of this road the Citizens Traction Company met a popular demand for service along this shortest route by the operation of its cars from Oil City to the village of Reno and connecting with the recently inaugurated bus route from Reno to Franklin, the latter service being conducted by the Citizens Transit Company, incorporated for the purpose, as the Citizens Traction Company's charter did not include railless operation.


INTERIOR OF BUS LOOKING FORWARD

The bus is scheduled to make one round trip per hour connecting with the Oil City-Reno cars at Reno and the local lines in the heart of Franklin. The through fare on the combination bus route between Oil City and Franklin is the same as has heretofore been charged, namely, 32 cents by cash fares or 30 cents by tickets.

The body is the Brill design for this capacity of bus and is mounted on a Mack 2-ton chassis, model AVDR, of the International Motor Company. The underframe is of composite construction and the body of wood sheathed on the outside with No. 18 sheet steel. The two-leaf folding doors are manually operated from the driver's position and inclose the double stationary steps. There is also an emergency door in the center of the rear end of the body, which is glazed in the upper portion, conforming to the rest of the construction. An outstanding feature of the body design is the use of single drop sash. This permits lighter roof construction and, consequently, lowers the center of gravity.

The interior finish is of ash with top carlines showing. Agasote is used on each side below the windows. Seating accommodations are provided by five Brill "Waylo" stationary type seats on each side of the aisle and a seat extending across the rear end of the body for five passengers. The section of this seat in front of the emergency door is removable. All transverse passenger seats have backs and cushions of the spring type upholstered in cane. The driver's seat is upholstered in leather.

It is a significant point to note that the management does not expect an increase in revenue from this bus installation, since much of the traffic will undoubtedly be diverted from the through electric railway service furnished via Monarch Park, a distance of 12 miles.

## Electric Railways Operating Motor Buses

ACCORDING to a census of automotive equipment recently taken by the ELECTRIC RAILWAY JOURNAL there are twenty-five electric railway companies in the United States that are today operating passenger motor buses. These companies either own or control the operation of 128 motor vehicles and four trailers which represent an investment of approximately $495,000.

There seems to be only one type that predominates, namely the 20 seat vehicle, of which there are 27, with the 17 passenger second with 21 vehicles. The 16 seat vehicle is third in favor with 17 and of the 12 passenger type there are 16. There are eleven 30-passenger bodies and ten that have a seating capacity of 18.

The prepayment system of fare collection is used in the majority of instances, the exception being the Pacific Electric Railway, Los Angeles, which uses both the prepayment system and the Ohmer register; the Connecticut Valley Street Railway, Greenfield, the Rooke register, and the Escañaba Power & Traction Company, the overhead register. The method of fare collection is not specified by the Bakersfield & Kern Electric Railway, San Francisco Municipal Railways, Dubuque Electric Company, St. Joseph Railway, Light, Heat & Power Company and Lincoln Traction Company.

The accompanying table shows the seating capacity, the year of purchase and the kind of tires used.

## Buses Do Large Business

### Statistics from Pacific Coast State Show that One Dollar of Investment Earns Three in Revenue per Year—Margin of Profit Not Large

AN OUTSTANDING feature of recent development in the motor bus business in California is the consolidation of companies in the interest of more economical and efficient operation. A typical case is the recent formation of an association in Stockton, whereby sixty cars formerly operated by a number of small companies and individuals, after more or less continuous competition over 280 miles of highway, have been put under a common administration which is expected to make material improvement in service and profits to owners. Combinations have been formed in both south and central parts of the state, and stage depots, where a number of lines have a common terminal, are becoming popular.

Records of the California Railroad Commission for the year ended Oct. 31, 1920, show that 350 motor bus passenger carriers reported for the year total receipts of $6,856,161 and expenses of $6,028,821. A total of 157 freight transport carriers, reporting for the same period, showed receipts of $2,401,336 and expenses of $2,292,889. The tables on page 320 give some weighted averages for the motor bus passenger companies affiliated with the Motor Carriers' Association of California and also for three individual typical routes.

With improvement of operating conditions, better roads and more business, the type and style of passenger cars has been very greatly improved. The accompanying illustrations show a typical passenger car of a few years ago and the present modern semi-closed

DATA COVERING MOTOR BUSES OPERATED BY ELECTRIC RAILWAY COMPANIES (JULY, 1921)

| Name of Company | No. | Type | Year of Purchase | Seating Capacity (Each) | Capacity of Chassis | Tires |
|---|---|---|---|---|---|---|
| **Arkansas** | | | | | | |
| Intercity Terminal Ry., Argenta | 4 | Mack | 1915 | 20 | 2 tons | Pneumatic |
| | 3 | Oldsmobile | 1920 | 16 | 1 ton | Pneumatic |
| **California** | | | | | | |
| Bakersfield & Kern Elec.R.R. | 2 | Studebaker | 1918 | 12 | ...... | Pneumatic |
| | 3 | Ford | 1920 | 12 | ...... | Pneumatic |
| Pacific Electric Ry., Los Angeles | 2 | Case | 1917 | 24 | ...... | Solid |
| | 2 | Reo | 1920 | 16 | ...... | Pneumatic |
| San Francisco-Oakland Ter. Rys. | 4 | White | 1921 | 18 | 2½ tons | Pneumatic |
| Pacific Gas & Electric Co., Sacramento | 1 | Ford | 1916 | 12 | ...... | Pneumatic |
| | 1 | Dodge | 1918 | 14 | ...... | Pneumatic |
| | 1 | Dodge | 1919 | 14 | ...... | Pneumatic |
| **California** | | | | | | |
| San Francisco Municipal Rys | 5 | White | 1918 | 30 | ...... | Pneumatic |
| | 1 | White | 1919 | 30 | ...... | Pneumatic |
| | 3 | White | 1920 | 30 | ...... | Pneumatic |
| San Jose Railroads | 1 | Case | 1916 | 16 | ...... | Pneumatic |
| | 1 | Ford | 1919 | 12 | 1 ton | Pneumatic |
| Santa Barbara & Suburban Ry | 3 | Studebaker | 1917 | 16 | ...... | Pneumatic |
| | 3 | G. M. C. | 1920 | 16 | ...... | Solid |
| Stockton Electric Ry. Co. | 1 | Moreland | 1915 | 16 | ...... | Solid |
| | 1 | Moreland | 1916 | 16 | ...... | Solid |
| | 1 | Moreland | 1917 | 32 | ...... | Solid |
| **Connecticut** | | | | | | |
| The Connecticut Company | 8 | Reo | 1921 | 12 | ...... | Pneumatic |
| | 3 | Packard | 1921 | 27 | ...... | Pneumatic |
| **Iowa** | | | | | | |
| Dubuque Electric Company | 3 | .......... | 1918 | 15 | ...... | .......... |
| **Maryland** | | | | | | |
| Baltimore Transit Co., controlled by United Rys. & Elec. Co., of Baltimore | 20 | White | 1917 | 17 | ...... | Solid* |
| **Massachusetts** | | | | | | |
| Bay State System | 1 | Garford | (*a*) | 30 | ...... | Pneumatic |
| | 1 | Reo | | 20 | ...... | Pneumatic |
| | 1 | Oldsmobile | | 20 | ...... | Pneumatic |
| Connecticut Vy. St. Ry., Greenfield | 3 | Cadillac | 1919 | 20 | ...... | Pneumatic |
| Holyoke Street Ry | 2 | Reo | 1921 | 16 | ...... | Pneumatic |
| | 1 | Internatl. | 1921 | 16 | ...... | Pneumatic |
| **Michigan** | | | | | | |
| Escanaba Pwr. & Trac. Co. | 1 | White | 1919 | 14 | ...... | .......... |
| **Missouri** | | | | | | |
| St. Joseph Ry., Lt., Ht. & Pwr. Co. | 1 | G. M. C. | 1917 | .. | ¾ ton | Pneumatic |
| **Nebraska** | | | | | | |
| Lincoln Trac. Co. (not in use) | 1 | Oldsmobile | 1920 | 12 | ...... | Pneumatic |
| | 1 | Ford | 1920 | 13 | ...... | Pneumatic |
| **New York** | | | | | | |
| Niagara Gorge Bus Line (Controlled by Niagara Gorge R.R. Co.), Niagara Falls | 1 | White | 1918 | 22 | ...... | Pneumatic |
| | 1 | Stewart | 1918 | 17 | ...... | Pneumatic |
| | 1 | Mack | 1920 | 30 | ...... | Pneumatic |
| | 1 | Packard | 1921 | 32 | ...... | Pneumatic |
| **Oklahoma** | | | | | | |
| Okmulgee Tract'n Company | 6 | Oldsmobile | 1920 | 42 | ...... | Pneumatic |
| | 4 | Lautz | 1920 | | | Solid |
| **Pennsylvania** | | | | | | |
| Citizens' Transit Co., controlled by Citizens' Traction Co., Oil City | 1 | Mack | 1921 | 25 | 2 ton | Solid |
| Johnstown & Somerset Ry. | 1 | Packard | 1921 | 22 | ...... | Pneumatic |
| **Texas** | | | | | | |
| Ft. Worth Auto Bus Co., controlled by Northern Texas Traction Co. | 8 | White | 1917 | 20 | ...... | Pneumatic and Solid |
| **Washington** | | | | | | |
| Seattle Municipal Ry. Co. | 1 | White | 1919 | 20 | ...... | Pneumatic |
| | 1 | White | 1919 | 20 | ...... | Pneumatic |
| | 1 | Garford | 1920 | 18 | ...... | Pneumatic |
| | 1 | Garford | 1920 | 18 | ...... | Pneumatic |
| **Wisconsin** | | | | | | |
| Milwaukee Elec. Ry. & Lt. Co. | 1 | Packard | 1919 | 40 | ...... | Pneumatic |
| | 8 | Reo | 1919-20 | 20 | ...... | Pneumatic |
| | 1 | Nash | 1920 | 40 | ...... | Pneumatic |

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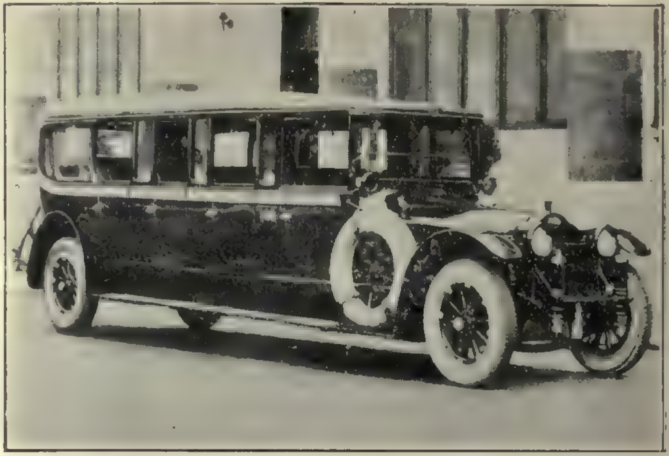
* On Sewell Cushion Wheels.

(*a*) Operated on contract basis for railway company.

TYPICAL EARLY TYPE MOTOR BUS OPERATED IN CALIFORNIA SERVICE


TYPICAL PRESENT DAY TYPE OF SEMI-INCLOSED BUS NOW IN EXTENSIVE USE

bus of a type being used in many parts of the state. Today bodies are built with the idea of giving a maximum amount of comfort to the passenger. As will be noted the appearance is good and an endeavor has been made to follow the best practice in stream lining.

ANALYSIS OF PASSENGER TRANSPORTATION COSTS—MOTOR CARRIERS' ASSOCIATION OF CALIFORNIA—YEAR ENDED DEC. 31, 1920

| | Actual | Unit | Item |
|---|---|---|---|
| Number of companies | 7 | .......... | ...... |
| Mileage of highway used | 1,182 | .......... | ...... |
| Passenger cars | 196 | Per mile highway | 0.1656 |
| Total seating capacity | 2,671 | Average per bus | 13.6 |
| Bus-miles operated | 11,430,061 | Per mile highway | 9,690 |
| | | Average per bus | 58,400 |
| Passengers carried | 4,315,874 | Per mile highway | 3,660 |
| | | Per bus-mile | 0.379 |
| Passenger revenue | $2,149,541 | Per mile highway | $1,820 |
| | | Per bus-mile | 18.8c. |
| | | Average fare per passenger | 48.7c. |
| Operating expenses | $2,319,135 | Per mile highway | $1,965 |
| | | Per bus-mile | 20.35c. |
| Taxes and licenses | $19,868 | Average per bus | $101 |
| Liability insurance | $72,839 | Average per bus | $372 |
| Investment | $776,315 | Average per bus | $3,970 |

NOTE.—There are a total of eighteen companies in the passenger motorbus transportation service operating over 3,400 miles of highway, and having available for service 412 vehicles capable of seating 5,603 passengers. Only seven furnished complete information as shown above.

ANALYSIS OF OPERATING COSTS—TYPICAL PACIFIC COAST BUS ROUTES

| | Motor Transit Company, Los Angeles (a) Actual | Per Bus-Mile | Western Motor Transport Company, Oakland(a), Actual | Per Bus-Mile | Tacoma (Wash.), Olympia Stage Line (b), Actual | Per Bus-Mile |
|---|---|---|---|---|---|---|
| Traffic per month average | 300,000 | ..... | ..... | ..... | ..... | ..... |
| Maximum mileage per month per bus | 9,000 | ..... | ..... | ..... | ..... | ..... |
| Average monthly bus-mileage | 505,000 | ..... | 70,000 | ..... | 29,096 | ..... |
| Passenger revenue | $114,000 | 27.60 | $27,500 | 39.25 | $7,836 | 26.95 |
| Costs of Operation: | | | | | | |
| Fuel | | | | | 618 | 2.12 |
| Oil | $13,290 | 2.63 | ..... | 3.00 | 69 | 0.24 |
| Tires | 15,507 | 3.06 | ..... | 3.50 | 528 | 1.82 |
| Repairs (parts and labor) | 19,387 | 3.80 | ..... | 4.70 | (c) 125 | 0.43 |
| Depreciation | ..... | ..... | ..... | 3.00 | 1,250 | 4.30 |
| Miscellaneous | ..... | ..... | ..... | ..... | 115 | 0.39 |
| Drivers | 19,051 | 3.77 | ..... | 3.50 | 1,156 | 3.98 |
| General superintendence | ..... | ..... | ..... | ..... | 350 | 1.20 |
| Other expenses | 35,000 | 6.92 | ..... | ..... | ..... | ..... |
| Insurance | ..... | ..... | ..... | 1.00 | 166 | 0.57 |
| Rent | ..... | ..... | ..... | 1.50 | 50 | 0.17 |
| Printing and advertising | ..... | ..... | ..... | 1.00 | 100 | 0.34 |
| Office expense | ..... | ..... | ..... | 2.00 | 200 | 0.68 |
| Total | 102,235 | 20.22 | 16,240 | 23.20 | 4,727 | 16.24 |
| Taxes and licenses | ..... | ..... | ..... | ..... | 44 | 0.15 |
| Interest at 7 per cent | ..... | ..... | ..... | ..... | 300 | 1.03 |
| Surplus | ..... | ..... | ..... | ..... | 2,765 | 9.53 |
| No. of motor buses | ..... | ..... | ..... | ..... | 7 | ..... |
| Type of machine | White | ..... | White | ..... | White | ..... |
| Model | ..... | ..... | ..... | ..... | 15 | ..... |
| Seating capacity | ..... | ..... | ..... | ..... | 14 | ..... |

(a) Figures for May, 1921. (b) Figures for September, 1920. (c) Estimated.

The low type chassis and body are now coming into favor as it seems to have been pretty well established that a lowering of the center of gravity results in a saving on tires and adds materially to the safety of operation.

# Detroit Trolley Buses

### Bids Asked for Trolley Buses that Can Easily Be Converted Into Gas-Driven Units—To Have All-Steel Body Seating Twenty-Nine Passengers

THE Department of Street Railways of the city of Detroit has recently asked for bids on fifty trolley buses. Ten of these are for immediate delivery, but the others are not to be delivered until the first lot has been tested in service and any changes shown necessary in such operation have been agreed upon. Mention was made in the ELECTRIC RAILWAY JOURNAL for July 2, page 37, that the city was considering the use of this type of vehicle for supplementary service with existing rail lines.

The specifications provide that the chassis must be built to accommodate either electric motors or gas engines, so that in case operation of the trolley bus proves unsuccessful the vehicles can be easily converted into motor buses. Each bus is to seat twenty-nine passengers and must weigh light not less than 9,000 lb. and be capable of transporting a load of 7,500 lb. With these buses it is proposed to maintain a minimum scheduled speed of 8.5 m.p.h. with nine stops per mile and an acceleration of between 1½ and 2.0 miles per hour per second.

The specifications call for a metal body of the truss side type with structural steel angle sills formed to the shape of a wheel housing over the rear axle. Pressed steel posts and letter board are to be used and the roof is to be made of wood or Haskelite so that persons can be supported thereon without damage to the roof. Two trapdoors are to be put in the floor of the bus, one to be over the rear axle housing and the other over the motors. An entrance and exit door is called for on the right hand front side. It is to have about 26 in. clear way. The doors fold outward and are of the two-panel jacknife type and are operated by ball bearing, National Pneumatic Company's hand lever control. In the rear there is an emergency door controlled by an electric lock under glass which when broken releases the lock and allows the door to be opened. The windows are of the raised sash type and push up so as to give 12-in. clearway. The inside finish is birch, stained mahogany color, and the roof above the sash white enamel. Lighting is obtained from six 23-watt railway lamps on two circuits. One circuit covers five interior lamps, while the other covers one interior lamp, two headlights, a step light and an illuminated sign light.

Miscellaneous fittings called for include two Nichols-Lintern tail-lights, a Faraday buzzer system, Cutler-Hammer 500-watt 296-volt single-unit truss plank heaters, two of which are connected in series; Rex all-metal rollers, double coated curtain material and Curtain Supply Company's fixtures. Steel tubing is used as a railing to separate the driver from the passengers. An operator's mirror 22 x 8½ in. is located so that the operator can obtain a full view of the passengers in the bus. Three exhaust ventilators are located on the center line of the roof and are covered with metal shutters. Johnson type D fare boxes are conveniently mounted at the entrance.

The bids, which were opened Aug. 18, ranged from $7,325 to $10,500.

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# New Track and How It Was Financed

### The Gary Street Railway Finances Locally the Reconstruction of 1.8 Miles of Track Using Mechanical Ties to Reduce the Thickness of Concrete and Avoid Too Great Rigidity

AUTHORIZED by the Public Service Commission of Indiana to issue $75,000 of first mortgage 5 per cent gold bonds for the purpose of reconstructing 1.8 miles of single track on Broadway, the main street of Gary, Ind., the Gary Street Railway set out to dispose of these bonds through the usual channels. President Charles W. Chase went east to dispose of the bonds there, while T. G. Hamilton, superintendent and purchasing agent, went to Chicago to see what could be done in that city. Both returned to Gary unsuccessful. But having faith in the merit of the securities offered and confidence in the future of Gary and its street railway property, they determined to dispose of these bonds locally.

A plan was evolved to first interest the employees in purchasing these bonds and then, having won their active interest, to endeavor to sell bonds to the public through the employees. Since the total outstanding first mortgage obligations of the company are only $375,000, including the present issue, whereas the value of the property as recently established by the Public Service Commission is $1,800,000, exclusive of good will or any franchise values, the officials felt perfectly safe in inducing the employees to invest their savings with the company.

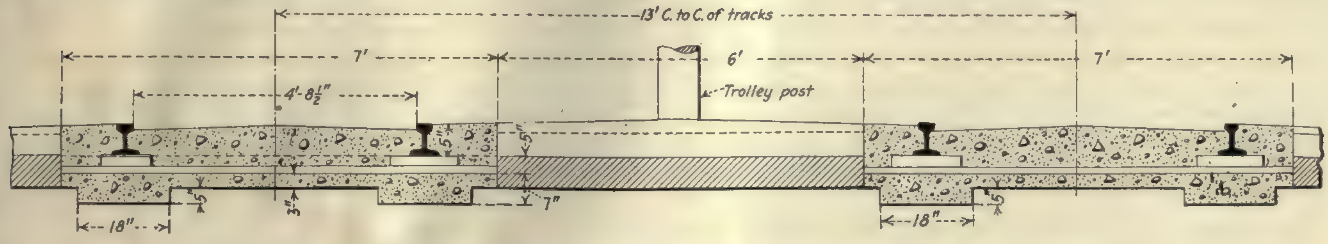
A letter setting forth the details was addressed to each employee and he was invited to buy as many bonds as he could for $85 cash, or $87.50 payable in ten months; that is, $4.37 from each semi-monthly pay, per bond. While the management has felt that it was very close to its employees, the response that came to the offer of bonds was a surprise even to them. Of the trainmen, 96.3 per cent bought from one to five bonds, while 76 per cent of the shopmen, 37.7 per cent of the trackmen, 57.5 per cent of the salaried employees and 68.1 per cent of the linemen also purchased one or more bonds. Altogether, of the 272 employees, 201 or 74 per cent, bought bonds, the total amount subscribed being about $35,000.

The assistance of the employees was then secured in disposing of additional bonds to the public, to whom they were offered at $90, the employee making the sale receiving a commission of $2.50 for each $100 bond sold. Through them and the efforts of the officials direct, an additional $25,000 of bonds were disposed of to the public. Some of the local materials dealers from whom materials used in the track construction were purchased, accepted some of these bonds in part or total payment. The names of the merchants who purchased bonds were posted in the carhouse so that the trainmen and other employees might know who was helping to support the street car company and incidentally them.

The employees seemed to take a great interest in this proposition and a number of them who could not purchase a bond came in to see the superintendent and tell him they were sorry they were not in a position to take a bond just then. At the time of this writing more than $60,000 worth of the bonds had been disposed of so that the necessary money for the new track was assured and construction work was well under way.

#### TYPE OF TRACK REPLACED

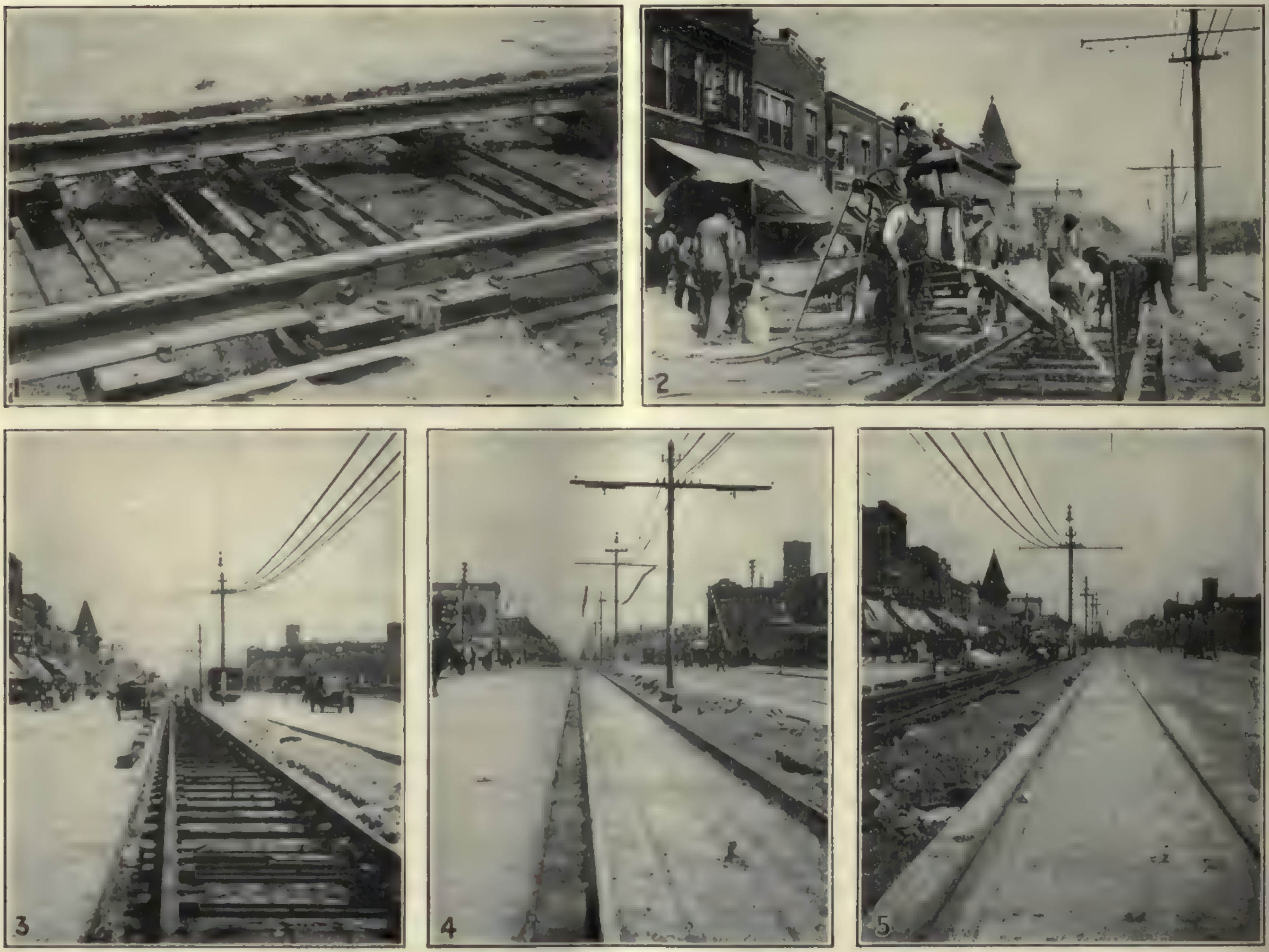
The track that is being replaced was built in 1907, shortly after Judge Gary established the new city among the sand dunes at the south end of Lake Michigan. It was laid with 60-lb. A.S.C.E. T-rail on oak ties directly on the sand, no other ballast being used. A concrete curb was built along either side of the 26-ft. trackway through the center of the broad street so that the sand was there confined. Simple four-hole angle bars were used to make the joints. This track has been subjected to a four-minute headway of local street cars all day, with a one and one-half-minute headway



CROSS-SECTION OF TRACK CONSTRUCTION SHOWING CONCRETE BEAM UNDER EACH RAIL during the morning and evening rush, and in addition has carried the cars of the Gary & Southern, the Gary & Valparaiso and the Gary & Hobart interurban lines which have operated over it hourly. Many of the ties are still good and are being reused on one of the interurban lines.

### MECHANICAL TIES EMPLOYED IN NEW TRACK

The new type of track now being built is of solid concrete construction, including the paving, and employing Dayton mechanical ties, Indianapolis apex electrically welded joints and 90-lb. A.R.A. T-rail of Illinois Steel Company section 9020 rolled in 66-ft. lengths. Several reasons were involved in the selection of these mechanical ties for use in this track. Because the local city authorities were making extensive use of concrete paving, it was highly desirable that the street railway should use the same type of pavement so that the street would be uniformly surfaced. The use of mechanical ties with the concrete foundation and paving construction reduced the thickness of concrete required by such an amount that this saving, taken in conjunction with the greater spacing of ties and the minimizing of labor in assembling, made it possible to build this type of track employing the concrete paving desired by the city at practically no greater expense than a good construction using wood ties and employing a less permanent paving. Furthermore, the use of these special ties provided a certain amount of resiliency which was considered highly desirable when going to an otherwise rigid construction, the reduction of noise being a factor in this case also.



VARIOUS STAGES IN THE CONSTRUCTION OF TRACK IN GARY

No. 1—Construction at the joints where special joint tie and electrically-welded plate are used. Excavation under the ties at the rails to form longitudinal beam can also be seen.

No. 2—Pouring in the first layer of concrete. The sand soil is first packed down by wetting in advance of the concreting by means of a hose.

No. 3—Rail and ties assembled and subgrade excavated ready for pouring foundation concrete.

No. 4—Pouring of the concrete base carried up even with the tops of the ties completed.

No. 5—Appearance of the completed track showing expansion joint locations in the distance.

An accompanying drawing shows a cross-section of the track, from which it is seen that the concrete foundation was poured practically in the form of a beam under each rail. The surface of the trench was prepared so that the thickness of concrete along under the rails was about 7 in. under the ties and this was narrowed up to about 3 in. in the middle of the track. After the rails and ties were assembled, the track was blocked up to grade and alignment and the concrete poured up to the level of the base of the rails. This was allowed to set and thereafter the paving layer was poured and the whole structure allowed to cure three weeks before traffic was permitted over it. In adopting this more permanent type of construction an agreement was reached with the city whereby the width of street to be paved by the company was reduced from 26 ft. to 20 ft.

The rails were supplied in 66-ft. lengths and drilled with one hole at each end, used to hold the joint plate in position until welded. The use of this extra long rail and the absence of any drilling of rails or boring of ties minimized the amount of labor required on the job. A brace and socket wrench were used to set up the four bolts and clips on each mechanical tie. The joints in the rails were staggered and a special Dayton mechanical joint tie used at each joint. The two adjacent ties were spaced at 2-ft. centers from the joint tie and the remaining ties at 3-ft. centers. At the joints, the bond was formed by the welding of the Apex plate to the rail and the welding of the rail base to the tie plates. Cross-bonds were provided every 800 ft. by welding old 60-lb. rail, inverted, across underneath the base of all four rails of the two tracks. One of these cross-bonds was installed at either side of each railroad crossing and the two cross-rails then bonded together with a 5,000-circ.mil cable extending through the crossing and welded to the cross-rail on either side.

An expansion joint was provided every 40 ft. in the upper or pavement layer of concrete. These joints were made by inserting in the opening two strips of 6-in. x $\frac{3}{16}$-in. elastite projecting above the surface of the pavement about 2 in. The two strips were then hammered down into the opening and one strip bent over either way, filling the surface completely and smoothing over the separation between sections so that the joint is not felt by passing vehicles.

In 1920, the Gary Street Railway carried 11,270,503 passengers and operated 1,930,000 car-miles. The rate of fare is 8 cents cash or fourteen metal tickets for $1, and six school tickets for 25 cents. In the month of May, 1921, 74.3 per cent of the passengers paid cash, 23.4 per cent bought tickets and 2.3 per cent rode on school tickets. In June the corresponding tickets were 69.5 per cent cash fares, 28.7 per cent ticket fares and 1.8 per cent school tickets. Despite the fact that the car lines cross seventy-two railroad tracks at forty-one locations, the average schedule speed of the safety cars used is 8.1 m.p.h. The total city system comprises 31.4 miles of single track. Normally the company carries about 40,000 passengers every week day, but at the present time, due to the slack business at the steel mills, the daily number of passengers is around 25,000. The safety car earnings run from 42 cents to 58 cents per car-mile on week days with seven to eleven passengers per car-mile. These figures are for the month of June, 1921, which is the lowest month in point of traffic that the company had had up to that time.

The double-truck Peter Witt type cars are earning from 46 cents to 76 cents per car-mile and carrying 6.9 to 10.8 passengers per car-mile. The wages paid to trainmen, most of whom have been with the company six or seven years or more, is 71 cents maximum for two-man cars and 76 cents for safety cars. The monthly operating ratio during the last six months has varied from 65 to 74 per cent, the latter having prevailed in June.

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The Milwaukee Electric Railway & Light Company is equipping all its interurban cars with Miller trolley shoes. It has been using some of these shoes for a long time, but has found that they give a better life if all cars on a line are equipped with shoes rather than to have some trolley wheels mixed in. The wheels seem to pit or burr the wire slightly, producing a rough surface which makes the wear on the shoes more rapid.

# Saginaw Service Still Suspended

### Prospect for Resumption by Railway Appears Remote—Each Succeeding Day Drives Home the Inadequacy of the Bus

SAGINAW and Bay City entered, on Aug. 24, their third week without electric railway transportation and little is known when there will be a resumption of service. Otto Schupp, the receiver for the Saginaw-Bay City Railway, is out of the city, and company officials profess to know nothing of what the future holds for the two valley cities.

One jitney accident, in which five persons were seriously injured, and a near accident have awakened the members of the Council to the fact that the operators of jitney buses must provide adequate insurance for the protection of the riding public. Mayor B. N. Mercer has taken the stand that unless operators do this, he will fight to the end that the jitneys must cease operations. Commissioners Holcomb, Johnson and Hammel are with him in this attitude, but Commissioner Phœnix, who has at every opportunity taken a position against the railway, wants to require only a small policy, saying, "I will not vote for any insurance which will drive these people off the streets."

TYPE OF VEHICLE AT DEPOT GREETING VISITORS

This commissioner never would help the company and at an informal meeting of the Council and the bus operators, urged that they be allowed to charge 1 cent for a transfer to "help them along." He has introduced in the Council an ordinance for the regulation of the buses and while seeming to insist upon strict measures, any time the question of the amount of insurance to be required from each owner comes up, he backs up and stands as the friend of the bus owner.

At the present time there are fifty buses operating under a go-as-you-please schedule. As a result during rush hours there is an entire lack of accommodations for the public. In fact the only time a person is reasonably sure of having a seat is the middle of the forenoon. Double fares are being charged, as no satisfactory arrangement has yet been worked out for issuing transfers. The jitney men say "just as soon as the ordinance is passed and if we can work under it then we will issue the transfers."

No figures are available, but it is freely stated that probably not more than twelve of the bus operators own their vehicles. Citizens generally know them to be irresponsible from a financial standpoint. In political circles, Commissioner Phœnix is given credit for wanting to frame a strong ordinance, with the exception of the insurance section. When the buses fail under his rule it is expected he will urge that the question of municipal ownership of the railway be submitted to the people. Since he has been in the Council this has been his one big hobby. How far he will get of course no one knows, but there has never been any pronounced movement along this line.

To protect the city's interests, it is expected the Council will notify the railway this week to operate its cars, and then as a matter of form will allow thirty days to elapse before declaring the franchise forfeited. What effect this will have on the situation is not known. The United States District Court is in charge of the property and how the company can do anything has not been explained.

REO BUS WAITING FOR PATRONS

The members of the Council with the exception of Commissioner Phœnix are not satisfied to forfeit the franchise and if the receiver decides to operate, with the jitney competition removed, it is expected that the Council will be glad to accept the proposition.

It is now well known that the jitneys cannot take care of the transportation needs of the city. Should manufacturing conditions improve they would be swamped. The last available reports on the labor situation showed only about 45 per cent of the normal number of workers employed.

Otto Schupp, receiver for the railway, announced on Aug. 24 that a rough inventory of the property now being made will be completed for submission to the United States District Court during the week ended Sept. 3. Until then no change is likely in the status of the case, Mr. Schupp said.

The Council has allowed two weeks for jitney owners to furnish insurance on each bus at the rate of $5,000 for one person, and $25,000 for one accident. Mayor Mercer held out for a $50,000 policy, but was voted down four to one.

The president of the Fair Association appealed to the Council to allow the Michigan Railway to operate during fair week. The usual attendance at this event is 800,000, but members of the Council were not in favor of this proposal. Transportation to the fair will, therefore, depend largely upon the uncertain public jitneys. The Fair Association has a $75,000 loss to meet this year.

The suspension of service and the receivership are the culmination of about two and a half years of almost continuous difficulty—tie-ups, strikes, court actions and settlement proposals. They were the direct result of the action of the people in rejecting the franchise presented for consideration on July 19, last.

In all, there have been four suspensions of service since March 23, 1919, to the present. They totaled 37½ carless days with twenty-four days the longest suspension and two days the shortest. Three times the suspensions resulted from strikes for higher wages, which the company refused on the ground that it could not grant them without increased fares. Once, the first time, the company ran its cars into the carhouses in refusal to operate for the old 5-cent fare.

The election on July 19 came as a result of representations by the Saginaw-Bay City Railway to the Council that unless some provision was made for higher fares and relief granted from jitney bus competition and paving burdens, the company would be forced into bankruptcy.

In a series of conferences between city and company representatives the early part of June, the service-at-cost franchise was worked out. In asking for this conference, the company reminded the city of an agreement reached last November, when the cars started after their twenty-four-day tie-up, in which the Council agreed to take up consideration of a new thirty-year franchise and the other points on which the company asked relief.

The history of that tie-up goes back to last fall, when the motormen and conductors demanded a 50 per cent increase in pay, only to be told by the company that this was impossible unless the city granted an increase in fares.

After appealing to the Council for a 10-cent fare, which was rejected together with a compromise offer by the Council of an 8-cent fare, with tickets selling at five for 35 cents, the company offered another compromise: A 10-cent fare with tickets at four for 25 cents, but this was ignored by the Council.

The requests for higher fares denied, the railway officials refused the demands of the men, who then went on strike. The county fair was on at the time, and although the strike started technically on Sept. 30 the tie-up was postponed by an agreement between the men and the Saginaw County Agricultural Society by which the employees continued to run the cars for the three days remaining of the county fair week. They were paid by the fair society, which, in turn, was reimbursed by the company.

The following Sunday midnight the strike started. Developments came rapidly. The city went into Circuit Court and obtained a mandamus ordering the company to live up to its franchise, then had the officials cited for contempt of court when they failed to observe the court's order. The carmen reduced their wage demands to 10 cents an hour—about a 20 per cent increase. Then, without warning, and shortly after a conference between company officials and the Council, the company started the cars, giving the men the demanded increase.

Two weeks elapsed before the public learned the reason for this sudden resumption of service. Then the company, in a communication to the Council, disclosed the fact that it considered the Council had promised a higher rate of fare would be granted if service were restored, something all the members of the Council denied was done. The Councilmen asserted that they merely told company representatives they would not consider any rate proposition whatever until the cars were running, refusing to treat with the company until service was restored, on the ground that the street railway heads were "outlaws" while they failed to obey the court's order.

Negotiations continued until Nov. 1, the men meanwhile receiving the wage increase they had asked. Then the men, refusing to accept a wage cut which the company announced would be necessary because of the Council's alleged failure to keep its agreement, struck again, starting the twenty-four-day tie-up.

The public utilities committee of the Board of Commerce took a prominent part in the negotiations that followed. It proposed a $200,000 bond issue by the city to build extensions, and also proposed a fare increase to the company. These negotiations at first failed to produce results, as did efforts by the Federation of Labor to bring about adoption of the Plumb plan for controlling the railway.

The city went into court again, asking that the company be compelled to live up to its franchise and that its officials be punished for contempt of court. Circuit Judges E. A. Snow and Clarence M. Browne upheld the injunction which had been granted several weeks previously ordering the cars to run, and adjudged the officials in contempt of court. But before the contempt proceedings could be finished the company obtained a writ of certiorari from the Supreme Court, which operated as a stay of proceedings.

The cars remained idle despite the court's action in upholding the injunction ordering them to start. But meanwhile the Board of Commerce committee had been active, and in a conference on Nov. 23 an agreement was reached between the city, the company and the men by which the cars were started Nov. 25.

Under this agreement the men submitted to a wage cut which took them back to their wages before the October strike, while the Council agreed to regulate jitney bus competition and immediately to take up consideration of a new thirty-year franchise, the cars to run meantime at the 6-cent fare then in force. The franchise, which the Council on that date agreed to frame and to submit to the people, is the one which the voters so emphatically refused to accept on July 19.

BUS AT CURB ABOUT TO DISCHARGE PASSENGERS

But that series of troubles was not the first the city had experienced. The initial tie-up came on March 23, 1919, when the company suspended service as a protest against the action of the voters on March 5 in refusing to approve the 6-cent fare granted by the Council in July, 1918. This tie-up lasted five and one-half days, ending when the city went into Circuit Court and obtained an order compelling the railway to observe the provisions of its franchise contract.

The second suspension started July 25, 1919, when the company, operating at a six-for-a-quarter rate of fare, refused its men an advance in wages unless the 6-cent fare were restored. This fight the company won, restoring service July 31, after the Council adopted another 6-cent fare ordinance. The first ordinance granting this rate had been repudiated by the people, but the second, identical in every way, was approved by the people by a big majority in September, 1919.

## Tentative Settlement Draft Presented

### In the Vernacular, Des Moines Is Still Walking, but Getting Nowhere—Presence of Mr. Harris in City Desired—Manager Chambers in Chicago

AFTER an eight-hour conference between F. C. Chambers, general manager of the Des Moines (Ia.) City Railway, and a special committee from the Retail Merchants' Association on Aug. 23, Des Moines seemed no nearer a solution of its railway difficulties than previous to Mr. Chambers' visit to Chicago. Mr. Chambers brought back a tentative draft of a new franchise prepared by the Harris interests, and while the details of the draft have been kept secret, it is understood that the main stumbling block will be the fare provisions, as retail merchants do not feel that an 8-cent fare franchise can be passed in Des Moines now.

The immediate result of the conference was a request from the committee that Mr. Chambers return to Chicago and attempt to have A. W. Harris come to Des Moines personally to conduct the negotiations with the committee. Mr. Chambers has returned to Chicago but no announcement by him had been made up to Aug. 25.

Seven more bus licenses were granted by the City Council on Aug. 23 under an agreement that the vehicles would be allowed to continue operation until Sept. 2, which is the last day of the Iowa State Fair. All outstanding licenses expire automatically on Aug. 31. Ten more buses are said to be on the way from Kansas City and operators now claim that 106 buses are in operation. This the railway men deny.

Bus operators have started a campaign to sell the bus proposition to the city and called a mass meeting of all civic and commercial organizations with the City Council for Aug. 25. The Council accepted the invitation. This will be first of a series of meetings to impress upon the public the difficulties which buses have encountered.

Five touring cars are now being used from which to supervise and direct bus operation, and guards have been placed at railroad crossings for the first time. The operators have agreed to place all new buses arriving in the city on the fair grounds line and not to reduce service on other lines. It is claimed that twenty-five buses will operate on the fair grounds line. The fair started on Aug. 24, and for about five days it will be necessary to transport about 50,000 people a day.

City Councilman John Budd on Aug. 23 offered a preliminary plan for allowing the buses a three-year grant. He urged that a reliable corporation be granted a franchise and the present makeshift arrangement be abolished. Mr. Budd proposed a fleet of from 150 to 175 buses with a minimum seating capacity of twenty for each vehicle and a limit on seating capacity of thirty.

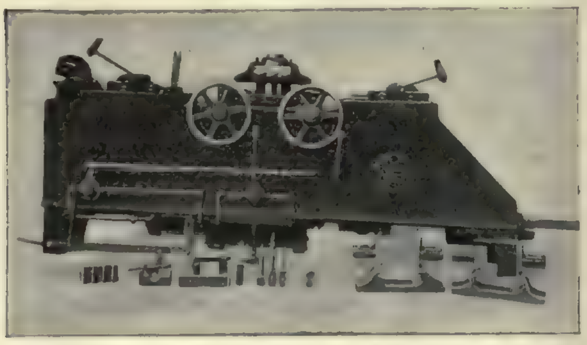
# Equipment and Its Maintenance

*Short Descriptions and Details of New Apparatus of Interest to the Industry. Mechanical and Electrical Practices of All Departments*

## Hose Dismantling and Assembling Machine

**A New Device—Cuts Clamp Bolts, Removes Nipples and Couplings and Assembles the Various Parts of Air, Steam and Signal Hose, Which Speeds Up This Work Considerably**

THE Covington (Va.) Machine Company, Inc., has placed on the market a new type of machine for dismantling and assembling air-brake, signal and steam hose. In addition to saving much time in performing this work, the use of the machine insures that all clamps, couplings, nipples, etc., are not strained or distorted in the removal operation, so that they can be used again without danger.


Machine for Dismantling and Assembling Hose

The accompanying illustration shows the machine as constructed, together with the entire equipment of tools for performing the various operations. To remove the fittings from old hose, the first operation is to cut the clamp bolts. This is performed by a special shear knife located to the left of the machine in the illustration. The operator places the hose in position and by pressing down the pedal the bolts are cut without injury to the hose clamp.

The coupling and nipple are removed by a single operation. To perform this operation the hose is clamped in the central portion of the machine and the nipple and coupling pullers are dropped into position.

The pressure for clamping the hose is obtained by moving the lever shown at the right and by moving the lever at the center of the machine air is admitted to the pulling cylinder, which removes both fittings, together with the clamp from the hose without injury. The operation for stripping the various types of hose is the same, but different sized tools are used to suit the different types of hose.

To assemble the fittings the new hose is laid between two straight clamping blocks which are brought together by the air pressure in the clamp cylinder. These blocks hold the hose straight and without danger of injury. The coupling is held in the same fixture as is used for dismantling and the nipple is placed on a centering fixture. The sliding heads which insert the fittings are brought together by moving the operating lever at the center of the machine to the left. The heads are then released and the hose clamps are brought together by means of the hand wheels and special jaws. The inserting and screwing up of the clamp bolts complete the operation.

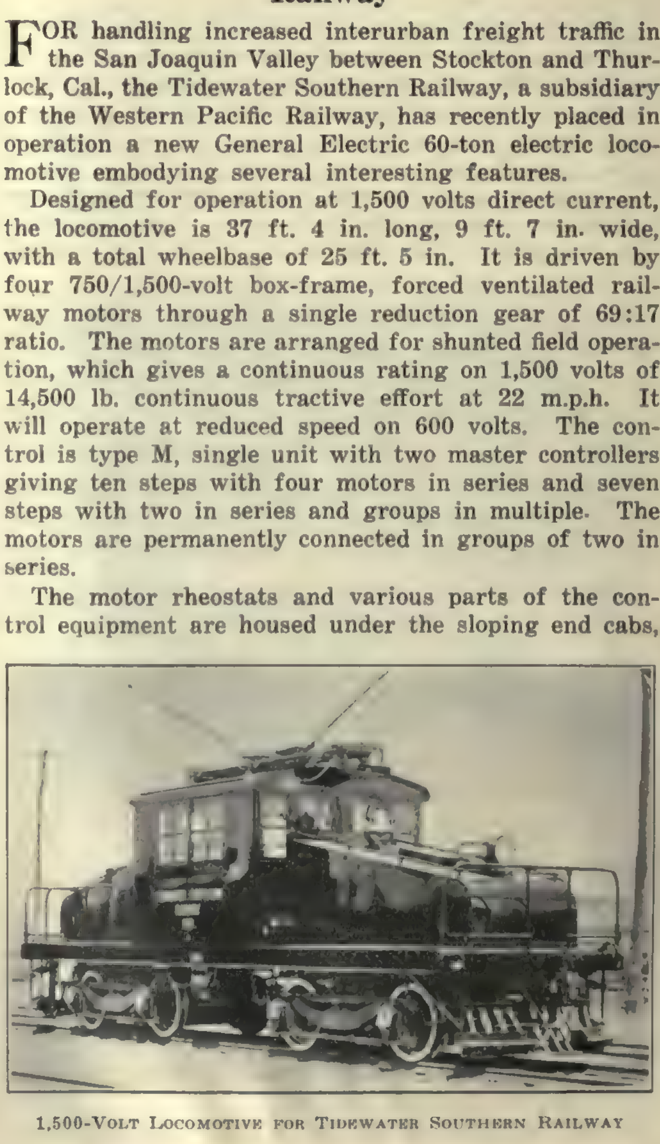
By the use of this machine it has been found that a single operator can readily dismantle 100 air hose per hour and assemble twenty per hour. The assembling operation is limited somewhat by the time necessary to screw up the clamp bolts, as this is the longest single operation in assembling.

## New Locomotive for Tidewater Southern Railway

FOR handling increased interurban freight traffic in the San Joaquin Valley between Stockton and Thurlock, Cal., the Tidewater Southern Railway, a subsidiary of the Western Pacific Railway, has recently placed in operation a new General Electric 60-ton electric locomotive embodying several interesting features.

Designed for operation at 1,500 volts direct current, the locomotive is 37 ft. 4 in. long, 9 ft. 7 in. wide, with a total wheelbase of 25 ft. 5 in. It is driven by four 750/1,500-volt box-frame, forced ventilated railway motors through a single reduction gear of 69:17 ratio. The motors are arranged for shunted field operation, which gives a continuous rating on 1,500 volts of 14,500 lb. continuous tractive effort at 22 m.p.h. It will operate at reduced speed on 600 volts. The control is type M, single unit with two master controllers giving ten steps with four motors in series and seven steps with two in series and groups in multiple. The motors are permanently connected in groups of two in series.

The motor rheostats and various parts of the control equipment are housed under the sloping end cabs,


1,500-Volt Locomotive for Tidewater Southern Railway

conveniently arranged for inspection and repairs. Current is collected through two pole trolleys which will operate through a range of from 14 ft. to 22 ft. above the rail.

There is a main switch with a magnetic blowout for opening the main circuit in emergency, or for inspection, and a complete equipment of auxiliary switches for the control of headlights, cablights, dynamotor blower set, compressor and compressor relay, control circuits, heaters, field shunting and control transfer.

Headlights as well as cablights, control and compressor relay are operated from the dynamotor, except when the locomotive is being run on 600 volts, when they are operated from the trolley. There are two CP-30 air compressors with a combined piston displacement of 70 cu.ft. per minute when delivering air at 100 lb. per square inch pressure. Air is supplied for sanders, bell ringer and control, in addition to the air brakes.

The present electrified system of the Tidewater Southern Railway is arranged for 1,200-volt operation, but will be changed over to 1,500 volts in the near future. The new locomotive was designed for operation at the higher voltage in view of the contemplated change in potential.

The locomotive carries all its weight of 120,000 lb. on the drivers. The cab is of the sloping end steeple type of construction, extending practically the whole length of the underframe, which consists of four heavy steel channels extending the entire length of the platform, and tied together by heavy steel end-frame castings. Each channel is riveted to the webs of the end frame castings and to the bolster plates on the bottom. The bolsters are built up of 1-in. steel plates, 10 in. in width riveted to all four longitudinal sills.

## Concrete Breaker in Cleveland

THE accompanying illustrations show a new machine developed by Charles H. Clark, engineer maintenance of way, Cleveland Railway, to break up the concrete pavement, or the concrete under and between the ties, in street railway tracks. The former method of using a ponderous weight is replaced by employing five hammers of less weight, and dropped on a point. All the hammers can be used at one time, or each one independently. In case of manholes or soft spots this becomes necessary.

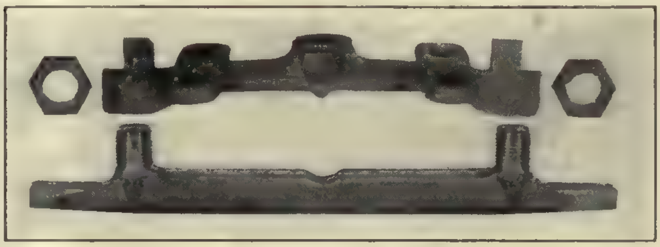
The car is moved at the rate of about 8 ft. per minute by the use of a separate clutch. The operation consists of spotting the car and allowing the weights to drop continuously till the concrete is shattered. The car is moved while the weights are going up.

The chains which carry the weight make a complete cycle in sixteen seconds which means two blows by each weight in this time, or a total of about thirty-eight blows per minute for the five hammers. The machine will break about 50 to 150 ft. of track per hour with two men at a labor cost of about 1 cent to 2 cents per foot of track.

## New Ear for Trolley Lines

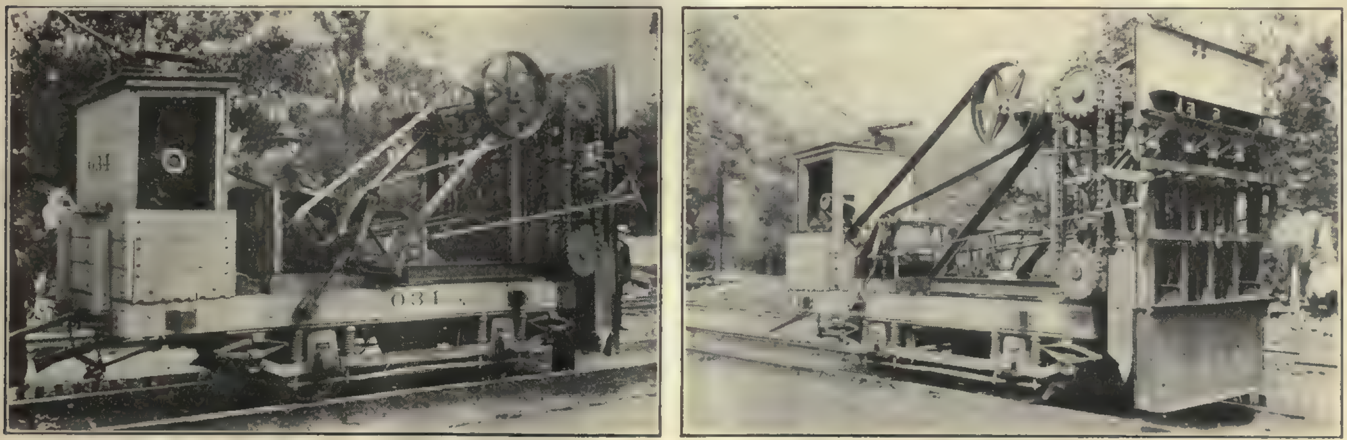
THE General Electric Company has recently developed a new form of strain ear, known as the Form S, for use in trolley construction. It consists of two parts, the shoe and the body, the latter being made of malleable iron and the former of either iron or brass as desired. It is installed without the use of solder.

The new ear has several distinct advantages over former types, in that it has a renewable shoe, or wearing part, and the shoe can be removed without the use of block and tackle, or without disturbing either the trolley or anchor wires. In applying it the body is put on the wire and the shoe clamped to it by means of bolts which fit on the threaded studs on the shoe. Once the body is in position it can stay there indefinitely, it being a simple matter to remove the shoe by loosening the clamping nuts.



STRAIN EAR DETAILS

In clamping the shoe into position the wire is slightly bent to follow the inequalities between the shoe and the body, which prevents the shoe from slipping on the wire. The anchor wires are attached to extension arms with 5-in. centers, preventing the trolley harp of a wild trolley from jamming or becoming wedged beneath the trolley and anchor wires. The shoe, which is the only wearing part, can be easily removed and replaced at a low cost without the necessity for special tools, and its cheapness helps considerably in lowering maintenance costs.



THIS CONCRETE BREAKER WILL DELIVER THIRTY-EIGHT BLOWS PER MINUTE

# American Association News

## Annual Convention Programs Ready

### Programs of the American and Affiliated Associations Include Important Topics and Allow Time for Discussion

THE following tentative programs for the American and four affiliated associations have been prepared for the annual convention at Atlantic City, October 3 to 7. While possible changes may of course be made in these programs before Oct. 3, such changes should be slight and the programs here given present a fairly accurate outline of the meetings as planned.

### Program of American Association

(All sessions open)

**Monday, Oct. 3, 1921**

9:30 a.m. to 5 p.m.

Registration and Distribution of Badges at booth at Boardwalk entrance to pavilion in front of Haddon Hall, corner of Boardwalk and North Carolina Avenue.

**Tuesday, Oct. 4, 1921**

9:30 a.m. to 1 p.m.

Meeting held in Vernon Room of Haddon Hall

Convention called to order.

Annual address of the president.

Annual report of executive committee.

Annual report of the secretary and treasurer.

Appointment of convention committees:

(a) On resolutions.

(b) On recommendations in president's address.

Special report of executive committee relating to recommendations on current matters and changes in constitution and by-laws.

Reports of committees:

Aera Advisory—Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.

Membership—F. R. Coates, president Toledo Railways & Light Company, Toledo, Ohio, chairman.

Company Section—Martin Schreiber, manager Southern Division and chief engineer Public Service Railway Company, Camden, N. J., chairman.

PAPER—**Contrasted Advantages of Service-at-Cost Contract Franchise and State Regulation**—EDWARD DANA, general manager Boston Elevated Railway, Boston Mass.

FORMAL DISCUSSION — ROBERT I. TODD, president Indianapolis Street Railway, Indianapolis, Ind.; S. B. WAY, vice-president and general manager Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

Reports of committees:

Publicity—Barron G. Collier, president Barron G. Collier, Inc., New York City, chairman.

Committee of One Hundred—Henry R. Hayes, Stone & Webster, Inc., New York City, secretary-treasurer.

Mail Pay—L. H. Palmer, assistant to president United Railways & Electric Company, Baltimore, Md., chairman.

National Relations—Charles L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., chairman.

Joint Committee of National Utilities Associations—P. H. Gadsden, vice president United Gas Improvement Company, Philadelphia, Pa., chairman.

**Wednesday, Oct. 5, 1921**

9:30 a.m. to 1 p.m.

Meeting held in Vernon Room of Haddon Hall

Report of committee on nominations.

Election of officers.

Reports of committees:

Electrolysis—W. J. Harvie, general manager Auburn & Syracuse Electric Railroad Company, Auburn, N. Y., chairman.

Trackless Transportation—H. B. Flowers, vice-president and general manager United Railways & Electric Company, Baltimore, Md., chairman.

One-Man Car—R. P. Stevens, president Republic Railway & Light Company, New York City, chairman.

TOPICAL DISCUSSION OF ELECTRIC RAILWAY FINANCE—H. M. ADDINSELL, Harris Forbes & Company, New York City; F. E. FROTHINGHAM, Coffin & Burr, Boston, Mass, chairman. Other speakers to be announced.

PAPER—**Comparative Position of the Industry Today and Four Years Ago**—HENRY A. BLAIR, chairman, Chicago Surface Lines, Chicago, Ill.

FORMAL DISCUSSION — ROGER BABSON, president Babson Statistical Organization, Wellesley Hills, Mass.; EDWIN GRUHL, vice president North American Company, New York City.

**Thursday, Oct. 6, 1921**

9:30 a.m. to 1 p.m.

Meeting held in Vernon Room of Haddon Hall

Report of committee:

Valuation — Martin Schreiber, chief engineer and manager Southern Division, Public Service Railway Company, Camden, N. J., chairman.

PAPER—**The Interest of Manufacturers in the Present Electric Railway Crisis.**—Author to be announced later.

PAPER—**Electric Railways and Their Community Uses**—J. R. BIBBINS, manager Department of Transportation and Communication, United States Chamber of Commerce, Washington, D. C.

ADDRESS — HERBERT HOOVER has been invited to speak on the subject, **Use of Electric Railways in Improving Industrial Efficiency.**

Reports of Convention committees:

(a) On resolutions.

(b) On recommendations in president's address.

Unfinished business.

General business.

Installation of officers.

Adjournment.

EVENING SESSION

A general meeting of the American and affiliated Associations has been planned for one evening of the convention.

The committee on subjects is arranging for a speaker of national prominence, while the committee on entertainment promises additional attractive features.

### Program of Engineering Association

**Monday, Oct. 3, 1921**

9:30 a.m. to 12:30 p.m.

Registration and distribution of badges at booth at Boardwalk entrance to pavilion in front of Haddon Hall, corner of Boardwalk and North Carolina Avenue.

2:30 p.m. to 5 p.m.

Meeting held in Solarium of Haddon Hall

Convention called to order.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary and treasurer.

Appointment of convention committees.

(a) On resolutions.

Reports of committees:

Apprenticeship Systems—F. R. Phillips, superintendent of equipment Pittsburgh Railways, Pittsburgh, Pa., chairman.

Heavy Electric Traction — Sidney Withington, electrical engineer New York, New Haven & Hartford Railroad, New Haven, Conn., chairman.

**Tuesday, Oct. 4, 1921**

2:30 p.m. to 5 p.m.

Meeting held in Solarium of Haddon Hall

Reports of committees:

Power Generation—A. B. Stitzer, chief engineer Republic Engineers, Inc., New York City, chairman.

Power Distribution — Charles R. Harte, construction engineer the Connecticut Company, New Haven, Conn., chairman.

NOTE—The joint report of the committee on stores accounting, representing the stores accounting committee of the Accountants' Association and the committee on purchases and stores of the Engineering Association, will be held in Accountants' Room in the Hotel Chalfonte at 2:30 p.m.

**Wednesday, Oct. 5, 1921**

2:30 p.m. to 5 p.m.

Meeting held in Solarium of Haddon Hall

Reports of committees:

Way Matters—R. C. Cram, engineer surface roadway, Brooklyn Rapid Transit Company, Brooklyn, N. Y., chairman.

Buildings and Structures — D. E. Crouse, chief engineer Rochester & Syracuse Railroad, Syracuse, N. Y., chairman.

**PAPER—Work of the Underwriters' Laboratories** — GEORGE B. MULDAUR, general agent Underwriters' Laboratories, New York City.

**Thursday Oct. 6, 1921**

2:30 p.m. to 5 p.m.

Meeting held in Solarium of Haddon Hall

Reports of committees:

Equipment—Daniel Durie, general superintendent West Penn Railways, Connellsville, Pa., chairman.

Unification of Car Design—H. H. Adams, superintendent of shops and equipment Chicago Surface Lines, Chicago, Ill., chairman.

Standards—Martin Schreiber, manager Southern Division, Public Service Railway, Camden N. J. chairman.

Report of convention committees:

(a) On resolutions.
General business.
Election of officers.
Installation of officers.
Adjournment.

## Program of Claims Association

**Monday, Oct. 3, 1921**

9:30 a.m. to 12:30 p. m.

Registration and distribution of badges at booth at Boardwalk entrance to pavilion in front of Haddon Hall, Boardwalk and North Carolina Avenue.

2:30 p.m. to 5 p.m.

Meeting held in Hall Pavilion of Haddon Hall

Convention called to order.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees:

(a) On resolutions.
(b) On nominations.

Reports of committees:

On constitution and by-laws.

Interchange of Claims Statistics—H. D. Briggs, assistant general claim agent Public Service Railway, Newark, N. J., chairman.

Membership—C. G. Rice, manager Associated Bureaus, Pittsburgh Railways, Pittsburgh, Pa., chairman.

Resolutions—A. G. Jack, claim agent Wilmington & Philadelphia Traction Company, Chester, Pa., chairman.

Safety—

Subjects—W. G. Fitzpatrick, general claim attorney Detroit United Railway, Detroit Mich., chairman.

**PAPER—Constructive Argument as Opposed to Constructive Contentions in Accident Investigations and Adjustments**—LOUIS H. BUTTERWORTH, attorner Boston Elevated Railway, Boston.

Discussion.

**PAPER—Essential Points to Cover in Accident Investigation**—R. C. GREEN, attorney Cleveland Railway, Cleveland, Ohio.

Discussion.

**Tuesday, Oct. 4, 1921**

2:30 p.m. to 5 p.m.

Joint Meeting with Transportation & Traffic Association.

Meeting held in Vernon Room of Haddon Hall

Reports of committees:

Traffic Regulation—H. B. Flowers, vice-president and general manager United Railways & Electric Company, Baltimore, Md., chairman.

Discussion.

Joint Committee on Safety Work—E. C. Spring, general superintendent Lehigh Valley Transit Company, Allentown, Pa., chairman; R. E. McDougall, general manager New York & Harlem Railroad, New York City, co-chairman.

Discussion.

**Wednesday, Oct. 5, 1921**

2:30 p.m. to 5 p.m.

Meeting held in Hall Pavilion of Haddon Hall

**PAPER—What Should Be the Method of Claim Departments in Handling Accidents and Claims?** — WALTER E. ROBINSON, claim agent Cincinnati Traction Company, Cincinnati, Ohio.

Discussion.

Free-for-all discussions:

(a) Value of Publicity in Claims Work.

(b) Best Method of Handling Hospital Cases.

(c) Auto Hazard.

(d) Using the Mails to Obtain Witnesses' Statements.

(e) Claims by Company for Damage to Its Equipment and How Such Claims are Handled.

Report of convention committees:

(a) On Resolutions
(b) On Nominations
Election of officers.
Installation of officers.
Adjournment.

## Program of Transportation and Traffic Association

**Monday, Oct. 3, 1921**

9:30 a.m. to 12:30 p.m.

Registration and distribution of badges at booth of Boardwalk entrance to pavilion in front of Haddon Hall, Boardwalk and North Carolina Avenue.

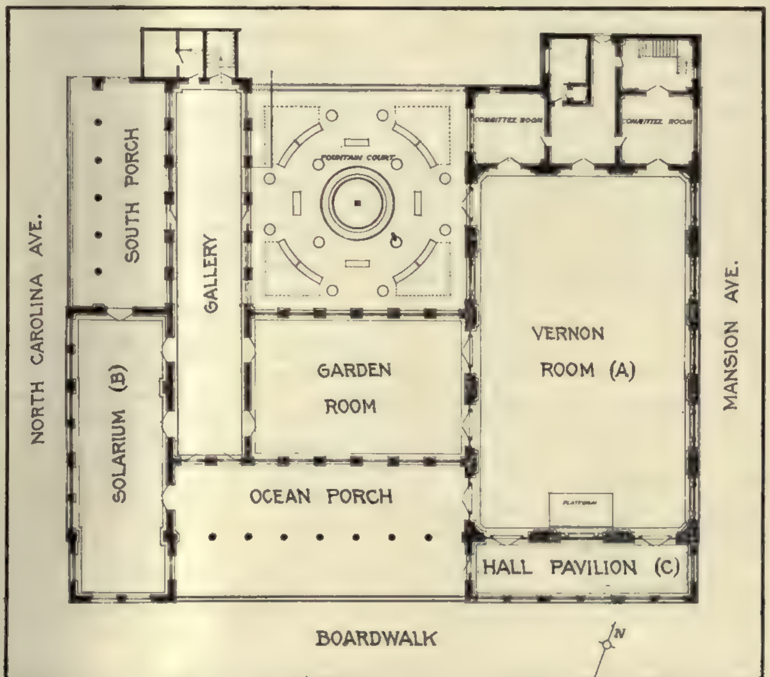
2:30 p.m. to 5 p.m.

Meeting held in Vernon Room of Haddon Hall

Convention called to order.

Annual address of the president.

Annual report of the executive committee.



ARRANGEMENT OF MEETING HALLS FOR ANNUAL CONVENTION AT ATLANTIC CITY

A—Meeting hall of the American and the Transportation and Traffic Associations.

B—Meeting hall of the Engineering Association.

C—Meeting hall of the Claims Association.

NOTE—The Accountants' Association will hold its meetings at the Chalfonte Hotel, except as noted in the program.

Annual report of the secretary and treasurer.

Appointment of convention committees.

(a) On resolutions.

(b) On nominations.

Report of committee:

Merchandising of Transportation—J. H. Alexander, vice-president Cleveland Railway, Cleveland, Ohio, chairman.

Discussion.

**Tuesday, Oct. 4, 1921**

2:30 p.m. to 5 p.m.

Joint meeting with Claims Association.

Meeting held in Vernon Room of Haddon Hall

Reports of committees:

Traffic Regulations—H. B. Flowers, vice-president and general manager United Railways & Electric Company, Baltimore, Md., chairman.

Discussion.

Joint Committee on Safety Work—E. C. Spring, general superintendent Lehigh Valley Transit Company, Allentown, Pa., chairman; R. E. McDougall, general manager New York & Harlem Railroad, New York City, co-chairman.

Discussion.

**Wednesday, Oct. 5, 1921**

2:30 p.m. to 5 p.m.

Joint meeting with Accountants' Association.

Meeting held in Vernon Room of Haddon Hall

Reports of committees:

Joint Committee on Economics of Schedules—Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman; A. G. Neal, comptroller Washington Railway & Electric Company, Washington, D. C., co-chairman.

Discussion.

Joint Committee on Express and Freight Traffic Promotion and Costs—F. W. Coen, vice-president Lake Shore Electric Railway, Sandusky, Ohio, chairman; L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ond., co-chairman.

Discussion.

**Thursday, Oct. 6, 1921**

2:30 p.m. to 5 p.m.

Meeting held in Vernon Room of Haddon Hall

Report of committee:

Personnel and Training of Transportation Employees—James P. Barnes, president Louisville Railway, Louisville, Ky., chairman.

Discussion.

Suggestions.

General discussion.

General business.

Report of convention committees:

(a) On resolutions.

(b) On nominations.

Election of officers.

Installation of officers.

Adjournment.

## Program of Accountants' Association

**Monday, Oct. 3, 1921**

9:30 a.m. to 12:30 p.m.

Registration and distribution of badges at booth at Boardwalk entrance to pavilion in front of Haddon Hall, corner of Boardwalk and North Carolina Avenue.

2:30 p.m. to 5 p.m.

Meeting held in Accountants' Room in Hotel Chalfonte

Convention called to order.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Appointment of convention committees:

(a) On resolutions.

(b) On nominations.

Reports of committees:

Standard Classification of Accounts—H. L. Wilson, treasurer Boston Elevated Railway, Boston, Mass., chairman.

Representing Accountants' Association at the annual convention of the National Association of Railway and Utilities Commissioners—C. S. Mitchell, comptroller Pittsburgh Railways, Pittsburgh, Pa., chairman.

PAPER—**Electric Railway Cost Accounting**—John Hall Bowman, C. P. A., Price, Waterhouse & Company, New York City.

Discussion.

**Tuesday, Oct. 4, 1921**

2:30 p.m. to 5 p.m.

Meeting held in Accountants' Room in Hotel Chalfonte

Joint Report—Stores Accounting.

Stores Accounting Committee of the Accountants' Association—R. A. Weston, special accountant the Connecticut Company, New Haven, Conn., chairman. Committee on Purchases and Stores of the Engineering Association—H. W. Staub, purchasing agent United Railways & Electric Company, Baltimore, Md., chairman.

Discussion.

PAPER — **Departmental Accounting, including Budget Control of Construction and Operating Expenditures**—H. C. Hopson, C. P. A., 61 Broadway, New York City.

Discussion.

PAPER—**Construction Accounting**—W. E. Jones, assistant comptroller United Electric Railways, Providence, R. I.

Discussion.

**Wednesday, Oct. 5, 1921.**

2:30 p.m. to 5 p.m.

Joint meeting with Transportation and Traffic Association.

Meeting held in Vernon Room of Haddon Hall

Reports of committees:

Joint Committee on Economics of Schedules—Edward Dana, general manager Boston Elevated Railway, Boston, Mass., chairman; A. G. Neal, comptroller Washington Railway & Electric Company, Washington, D. C., co-chairman.

Discussion.

Joint Committee on Express and Freight Traffic Promotion and Costs—F. W. Coen, vice-president Lake Shore Electric Railway, Sandusky, Ohio, chairman; L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., co-chairman.

Discussion.

Accounting members will return to Accountants' Room in Hotel Chalfonte.

Reports of convention committees:

(a) On resolutions.

(b) On nominations.

Election of officers.

Installation of officers.

Adjournment.

## Nominating Committee Appointed

PRESIDENT GADSDEN announced the following as the nominating committee of the American Association for the 1921 election. The committee was requested to report nominations as soon as practicable:

J. H. Pardee, president J. G. White Management Corporation, New York, chairman.

P. S. Arkwright, president Georgia Railway & Power Company, Atlanta, Ga.

F. G. Buffe, general manager Kansas City (Mo.) Railways.

W. A. Draper, vice-president Cincinnati (Ohio) Traction Company.

E. C. Faber, Barron G. Collier, Inc., New York.

Thomas Finigan, American Brake Shoe & Foundry Company, Chicago.

The appointment of this committee at this time is in line with the announced policy of the executive committee and is an invitation to the members at large to offer suggestions to this committee regarding the officers to be elected this fall.

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## Entertainment Committee Holds Meeting

THE Entertainment Committee in charge of activities for the Atlantic City Convention, Oct. 3-6, of which E. C. Faber, New York, is chairman, held its first meeting at association headquarters on Aug. 15.

The committee considered several plans for entertainment. A sub-committee was appointed which has, since the meeting, visited Atlantic City and prepared several suggestions for the entire committee to consider at its meeting Friday, Aug. 26. The entertainment features will be comprehensive, and all in attendance will be assured of not having any excess time on their hands.

# News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

## Daniel W. Smith a Seer

### No Future for Surface Electric Railways, Says Candidate for Mayor of Detroit

The possibility of the railway question in Detroit, Mich., again being made a political issue in the coming election for Mayor, became evident with the announcement by Daniel W. Smith, candidate for Mayor, that a communication has been prepared and will be sent to the Council requesting action by that body directing that plans be prepared at once by the Mayor and the Street Railway Commission, and estimates be obtained on the cost of a comprehensive rapid transit system to be owned and operated by the city.

### TRANSPORTATION REPORT IN PREPARATION

At about the same time the Street Railway Commission announced that a report would be made public which covers the complete transportation system in Detroit, including surface lines, subway and elevated road possibilities. This report has been in preparation two months.

The reason given by Mr. Smith for sending his communication to the Council at this time was that no steps have been taken by Mayor Couzens leading to rapid transit. It was further claimed that the present plan for municipal railways threatens to bring the city to the point where the city's bonding limit would be reached, without provision for a rapid transit system and no money available for carrying out such a system.

In referring to Mayor Couzen's proposed plan to operate jitneys and buses on Fort Street and Woodward Avenue, until tracks can be laid, in event the Detroit United Railway removes its tracks from these streets, as ordered by the city, Mr. Smith states that the situation which will result from such arrangement may reveal the lack of vision on the part of the present administration in carrying out the program for a municipal transportation system.

Mr. Smith questions the wisdom of paying $288,000 for the Fort Street and Woodward Avenue tracks of the Detroit United Railway, or taking over any of the property of the Detroit United Railway on streets that can be better served by rapid transit.

### SUBWAY SUGGESTED

A subway is suggested to be run in a northerly direction from the heart of the city to the Ford plant, or some place farther north. This, it is stated, should connect with the rapid transit elevated lines of the improved type running as crosstown or east and west lines. These lines, Mr. Smith states, should be augmented with motor buses, trackless trolleys or with some other surface lines all fitted into a system that will be adequate for Detroit's needs. Mr. Smith states that all large American cities are on the eve of a radical change in transportation methods.

Mr. Smith cites that jitneys are a product of hard times, but that the significant point remains that the working men and women in Detroit even in a period of depression, have been willing to pay a fare twice that collected on the electric cars, in order that they may shorten the running time between their homes and places of employment.

According to Mr. Smith, "the handwriting on the wall" is daily becoming more evident—that there is no future for surface electric railways, the people demanding more speedy means of transportation than can be afforded by surface lines.

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## Fresno Franchise Conferences to Continue

The conference held early in the present month between members of the City Commission of Fresno, Cal., and officers of the Fresno Traction Company over the new indeterminate franchise submitted to the commission by the railway adjourned without any settlement of the points at difference between the commission and the officials of the railway. In the opinion of City Attorney Johnston, the franchise in the form in which it was submitted by the railway would have to go to a vote of the people of the city before it could be put into effect by the city government. Members of the City Commission agreed that it was useless to go into a discussion of the details of the city charter until this question had been settled.

### OPINION DIVIDED OVER RECENT STATUTE

The attorneys for the railway are understood to have taken the position that the franchise as proposed by the company could be passed by the City Commission. It was suggested by Commissioner Anton that pending another meeting, the City Attorney of Fresno should communicate with other cities where the indeterminate franchise is in effect and secure the opinion of the City Attorneys on the various points that are in doubt in the present situation in Fresno.

The differences of opinion that exist as to the probable authority of the city to proceed with the negotiations have arisen over the fact that in 1919 the State Legislature passed a general statute for granting resettlement franchises by cities operating under a freeholder charter.

## Safety Council Progressing

### Community Wide Plan Well Under Way to Reduce Accidents—Railways Co-operating

The Chicago Safety Council, started April 16, 1920, has since been actively at work in a community-wide plan of education to reduce the loss of human life and property through accidents and carelessness. The council is organized as a department of the Chicago Association of Commerce and functions by means of four divisions and twenty committees and operates through the homes, schools, churches, industries and civic organizations, thus reaching and instructing practically the entire community in its important activities.

A school for safety supervisors was conducted by the Safety Council from Sept. 14, 1921, to March, 1921, with an average attendance at fifteen meetings of 475 men, the school graduating 283 men qualified to supervise safety work in industry. Beginning Dec. 2, 1920, a foreman's safety instruction course was conducted from which 310 men were graduated on June 7. Of these graduates, fifty were employees of the Chicago Elevated Railways. The average attendance at ten meetings was 525 foremen, representing approximately 50,000 workmen. A police and traffic committee was organized and has been energetically at work to prevent traffic accidents. On June 28 a motor drivers' safety instruction course was concluded, in which an average of 610 chauffeurs and truck drivers received practical instruction in safety, rules of the road, automobile mechanics, etc., and diplomas awarded to 469 graduates. A juvenile safety committee was completed which is now making an intensive study for the purpose of minimizing accidents to juveniles, representatives of the Boy Scouts, Camp Fire Girls, boys' clubs, etc., serving on this committee. An electric transportation committee was also organized, which is devoting its attention to the prevention of accidents involving the operation of street cars, elevated trains, taxicabs, motor buses, etc. Beginning Oct. 9 a "No Fire, No Accident Week" will be promoted in conjunction with the semi-centennial anniversary of the Chicago fire. Extensive plans are being laid for a safety campaign throughout the entire city.

The transportation companies in Chicago are, of course, taking an active part in this work, and will derive considerable benefit from the wide activity along safety lines that is being fostered by many influential men and through numerous organizations and committee.

## Making American Citizens

### North Shore Line Is Conducting Evening Classes for Its Trackmen, 78 per Cent of Them Foreigners

The Chicago, North Shore & Milwaukee Railroad is taking an interest in making American citizens of its trackmen, most of whom are foreigners. The company believes that in so doing not only would it be a material aid in the general need for Americanization work throughout the country, but that it would also result in making better employees of the men. The story is well told by Luke Grant in the July issue of *The North Shore Bulletin*, published by the company for the entertainment and edification of its patrons.

North Shore Line Trackmen at Waukegan Court House to Take Out First Papers

When it was decided a few months ago to begin a campaign of Americanization work among the track gangs of the North Shore Line, a general survey was made to obtain accurate information. The survey disclosed that at the time there were 129 men, including foremen, in these gangs and that 101 of them, or 78 per cent, were not American citizens. Twelve men were eligible to full citizenship, but 85 men, or 66 per cent, had not declared their intentions to become citizens, although they had been in the country upward of five years. In fact the average length of time in the United States of all the men was eleven years. The men ranged in age from eighteen to sixty years, the average being thirty-six years. Eighty-two men, or 64 per cent, could not write the English language and 58 per cent could not read it. Twenty-nine of the men, or 22 per cent, could not speak English and 27 per cent could neither read nor write their native tongue.

When the subject of attending evening school and learning to read and write English was broached to the men, the response was instantaneous and almost unanimous. True, the men were given to understand that the company preferred to have American citizens on its payrolls, who could speak and write our language, and that may have influenced some. There could be no mistaking, however, the earnestness of most of the men to attend school and their eagerness to learn. One of them expressed what was in the mind of many when he said through an interpreter, he would give $1,000 if he could learn to read and write English.

That the men are taking a great interest in the work is shown by a glance at the weekly report of C. G. Goodsell, director of Americanization work, showing the attendance. A full attendance is, of course, hardly to be expected, because at times there is emergency work to be done which necessitates the men absenting themselves from the classes. In spite of that a number of sections showed an 80 per cent attendance and Section No. 4 was 100 per cent. That section appears to have 100 per cent attendance week after week.

On the whole road there are fourteen regular section gangs and one extra gang and the schools are located to make it as convenient as possible for the men to attend. The classes are so arranged that each gang has two evenings a week. There is also a school for foremen. The classes are given "home work."

The teaching of English among the track laborers is made to fit in nicely with the safety work conducted by the North Shore Line. Each month a special car is run along the line from Evanston to Milwaukee and it picks up the track gangs wherever they happen to be at work. The car is then run to the nearest side track and a safety meeting is held at which some speaker gives the men an instructive talk on safe practices. The gang is taken back at the end of the meeting and the car proceeds to the next point. That method insures a full attendance of the men at safety meetings, because they are being paid for their attendance, but if they do not understand the English language they cannot derive much benefit from the talks.

Behind the whole plan is the big idea of making American citizens out of a class of laborers who are under a heavy handicap. Mr. Goodsell, the director, is assisted by J. S. Hyatt, engineer of maintenance of way, and by his assistant, F. J. Cramer.

## Reduced Pay in Allentown

A reduction of a little less than 10 per cent in the wages of motormen and conductors of the Lehigh Valley Transit Company, Allentown, Pa., became effective on Aug. 1. The following is the same scale that was in effect on Aug. 1, 1919:

| | Cents Per Hour |
|---|---|
| First year | 44 |
| Second | 48 |
| Third | 50 |

Twelve cents an hour extra for overtime. A guarantee of $2.25 a day.

## Wages Cut 4 Cents an Hour

Approximately $60,000 a year will be saved to the Memphis (Tenn.) Street Railway by the wage award which has been made by the arbitration committee. Wages of all employees are cut 4 cents an hour by the award. This amounts to $2.08 a week on the average for each man. The new wage scale under the award is 43 cents an hour for first-year men, 48 cents for second-year men, and 53 cents for men with three years or more service.

W. J. Bacon, representing the railway employees, opposed any cut in wages. Thomas H. Jackson, representing the company, sought a reduction of 12 cents as asked by the company. Judge Ben L. Capell was chairman of the board.

## Franchise Contracts Discussed

The Illinois Committee on Public Utility Information has issued a pamphlet, "Rate Contracts Between Municipalities and Utilities," prepared by Walter A. Shaw, an engineer and at one time a member of the State Utilities Commission. Mr. Shaw discusses the question of contracts and commission rulings from the viewpoint of the public representative. In view of the recent agitation over the charge that the Illinois State Public Utilities Commission broke contracts existing between utilities and municipalities in readjusting rates to meet existing conditions the booklet is very timely. In another pamphlet, the fifth of a series issued by the Illinois Committee, the legal status of rate contracts between utilities and municipalities is discussed. Material in this bulletin consists largely of citations from court decisions, findings of commissions and views of men who have made a special study of regulation and franchises, together with a statement set forth in question and answer form relative to the subject of so-called rate contracts.

## Franchise Vote in Houston on Sept. 27

The City Council of Houston, Tex., has set Sept. 27 as the date on which an election will be held at which qualified voters will pass on the new street railway franchise, which has just been completed after extended negotiations between the city and officials of the traction company.

The new franchise provides for an extension of 15 years from 1935 of the present franchise with certain changes. Valuation of the property of the Houston Electric Company is placed at $6,000,000 plus any capital expenditures since March, 1920. The new franchise also provides for earnings of 8 per cent on the agreed valuation and allows 4½ per cent depreciation.

The city has the right to demand a reduction in fare, which is now 7 cents, when earnings of the traction company reach the 8 per cent authorized. The city also has the right to call for a revaluation of the property as soon after the acceptance of the franchise as the city may deem expedient. In case the voters approve the franchise, the traction company is given thirty days in which to file notice of its acceptance.

## Helpful Editorial on Accidents

Efforts by the management of United Railways, St. Louis, Mo., to convince the public that it is the car riders who suffer when juries return excessive judgments against the transportation company is showing results through the press. In an editorial a few days ago the *Post-Dispatch* said:

> Street car carelessness cost car riders $715,268 last year That is what the United Railways paid out in verdicts for damages, court fees and compromise settlements as shown by the report of Col. A. T. Perkins, manager for the receiver. In theory the company paid it. But this is only a pleasant fiction. The public paid it. A certain percentage of the fares went for that purpose. That is one reason why it costs 7 cents to ride on St. Louis street cars.

The editorial directed attention to the fact that suing the railway is one of the most popular indoor pastimes. Last year 708 persons tried their hand at it. The plaintiffs won $515,268 and the plaintiff's lawyers got about $225,000. The cost last year was $318,000 more than the year before, and the way things are going now it looks as if the cost this year will be more than $1,000,000. Says the *Post-Dispatch* further:

> The one pleasant fact is that three-fourths of the cases are compromised. That shows that the spirit of compromise is present, and that is a good thing. Where there are so many passengers and so many employees there is bound to be some carelessness and some accidents which call for adjustment. The more they are settled out of court the less the cost to the traveling public.

## Grand Rapids Case Considered Again

The City Commission of Grand Rapids, Mich., met as a committee of the whole recently to discuss anew the proposal to grant a franchise to the Grand Rapids Railway with provision for a basis of return commensurate with the needs of the company.

It was stated by Attorney Knappen and concurred in by L. J. DeLamarter, manager of the railway, that the best of three proposals, both for the welfare of the public and the company, would be a valuation of $7,000,000 with an 8½ per cent return. The commissioners all practically agreed that the $600,000 revenue is essential to the welfare of the city as well as the company, in order that the service might be improved.

The company representatives stated a 10-cent fare for transient and casual riders, with tickets sold to regular patrons at four for 25 cents, would take care of the revenue at the present time, and that later this fare might be lowered.

## A Jitney Editorial

The accompanying editorial appeared in the Aug. 16 issue of the Greensburg (Pa.) *Record*. It is given here as an indication that lessons from the Des Moines jitney experience are being learned by the public of other cities as well. The editorial is, of course, only one of a great number of such comments, but it does bring home strikingly the lesson of the trolleyless city.

### *Jitney or Street Car?*

Out in Des Moines, Iowa, on the first day of this month all street car service was discontinued because of the inability of the street car company to pay running expenses, due to jitney competition.

Can the reader conceive what the situation would be in Westmoreland county if our own street car lines were put out of commission? The writer has had the experience of being in one city where there were no street cars, but that was at Newport, R. I., in the aristocratic section of the city where practically each member of the family had a "super-six" and the maids and butlers rode on bicycles. "We" traveled on "Shank's Mare" and would have given a great deal to have heard the welcome gong of a street car and gladly turned our shekels over to a blue coated conductor, with the confidence that we would reach our destination regardless of tire and engine troubles.

When it comes to a "toss up" between the street car and the jitney, give us the good old street car that is there when you want it, and you know that the conductor is not going to stick a revolver in your face and turn your pockets inside out, or beat it out a side street with your wife, or daughter, for a ransom—the auto bandit never kidnaps a mother-in-law.

If a street car company can't run on a five-cent fare then give 'em eight cents. The street cars are compelled to run rain or shine, hail or snow, while the jitney driver may be snoozing away until the weather becomes favorable. The jitney has its place, but it will have to get on a trolley and make a noise like a street car before it can fill the bill of the fast growing population of our towns and cities.

## New Power Contract Submitted at Toledo

Street Railway Commissioner Wilfred E. Cann has announced that the Toledo Railways & Light Company has submitted a new power contract which would save the Community Traction Company approximately $160,000 a year over the rate now being paid. The new contract would date back to Feb. 1, the time when the service-at-cost franchise went into effect. The report says:

> After numerous conferences with representatives of the Toledo Railways & Light Company, we have received what is emphatically stated to be a final proposition on the power rate; this new rate to be $24 per annum per kwh. for installed capacity as a demand charge plus 9 milles per kwh. for consumption plus the operation of the coal clause.
>
> For the six months ending July 31, the rate per kwh. on the basis would be 1.87734, and the total saving in the power bill over the same period would amount to $77,327. For the operation of the coal clause the net cost per kwh. for the next six months should be slightly less than 1.87, and the total reduction of the power bill for the first year of operation should be approximately $160,000. This offer is submitted on the basis of a one-year contract only and with the idea of a revised rate beginning Feb. 1 of next year. Upon the basis of $160,000 saving in power cost, reducing the monthly credits to the maintenance and repair fund, increased revenue from interurban travel, and the strictest economy in operation, I am convinced that by Oct. 1 we can have actual cash credits in each of the funds equivalent to the accrued set up, and by Feb. 1, which will complete the first year of operation, the deficit to the stabilizing fund should be reduced at least $40,000 leaving it with a balance of $220,000.

## Injunction for Jitneys at Rockford

The Fay Motor Bus Company, Rockford, Ill., which has been operating several lines of buses in Rockford for more than two years, under a certificate of convenience and necessity issued by the Illinois Public Utilities Commission, recently decided to go into full competition with the city lines of the Rockford & Interurban Railway, and attempt to supply transportation throughout the city at a 5-cent fare. The bus company has heretofore charged 10 cents and has been but partially in competition with the railway, which is charging a rate of fare of 8 cents. The decision to operate throughout the city was not preceded by a certificate from the commission, and consequently the railway was able to secure an injunction. This promptly put a stop to such operation.

The hearing on this temporary injunction will probably be had on Aug. 29 or shortly thereafter. Meantime Thomas J. Fay, president of the bus company, is endeavoring to secure the passage of a city ordinance permitting operation of buses throughout the city on a 5-cent fare. If such an ordinance were passed, the bus company assumes that this would be a strong inducement to the state commission to grant the certificate required. Mr. Fay has been active recently in an endeavor to secure a franchise to provide the complete transportation service in Des Moines, Ia.; in Decatur, Ill., and other places. It is understood that his 10-cent bus lines in Rockford have been popular and profitable.

## Details of Detroit's Trolley Bus Bids Announced

The following bids have been received by the Street Railway Commission, Detroit, for furnishing 50 trolley buses, specifications for which are given on page 320 of this issue:

| | Bidder | Bid per Bus F.o.b. Detroit |
|---|---|---|
| 1. | J. G. Brill Co., Philadelphia, Pa. | |
| | First 10 | $8,744.00 |
| | Remaining 40 | 8,544.00 |
| | Goodyear pneumatic tires additional | 800.00 |
| 2. | Standard Motor Truck Co., Detroit, Mich. | |
| | Total of 50 (war tax included) | 8,950.00 |
| | Pneumatic tires, additional | 735.00 |
| | Delivery first 10 120 days from order. | |
| 3. | National Safety Car Equipment Co., St. Louis, Mo. | |
| | Total of 50 | 7,325.28 |
| | Delivery first 10 from 7 to 10 weeks. | |
| 4. | St. Louis Car Co., St. Louis, Mo. | |
| | Total of 50 | 7,800.00 |
| | Delivery to begin 100 days after order. | |
| 5. | Packard Motor Car Co., Detroit, Mich. | |
| | Total of 50 with St. Louis Car Co. body (war tax included) | 8,065.09 |
| | Total of 50 with Cincinnati Car Co. body (war tax included) | 8,127.75 |
| | Total of 50 with Osgood-Bradley Co. body (war tax included) | 8,230.55 |
| | Total of 50 with Kuhlman Car Co. body (war tax included) | 9,486.36 |
| | Delivery, one complete 60 days, 20 in 60 to 90 days, and 50 in 90 to 120 days. | |
| 6. | Mack International Motor Truck Corp., Detroit, Mich. | |
| | Total of 50 (war tax included) | 9,988.00 |
| | Total of 10 (war tax included) | 10,488.00 |
| | Pneumatic tires, additional | 350.00 |
| | Delivery of first 10 in 80 days, then 2 per week. Complete in 108 working days. | |
| 7. | Trackless Transportation Co., New York, N. Y. | |
| | Total of 50 (exclusive of war tax) | 8,195.00 |
| | Pneumatic tires, additional | 200.00 |
| | Delivery from 90 to 120 days. | |

## Car Men Express Views

Employees of the Memphis (Tenn.) Street Railway have been conducting little talks in the *News-Scimitar* on the troubles of the street railway man, his ideas on service, etc. "Uncle Billie Miller," in the opening article of the series, discussed "When to Get Transfers." Another article is written by B. E. Hudson, a veteran motorman, who speaks on behalf of all his associates of the Memphis Street Railway. He makes an especial appeal to automobile drivers to allow the car man to have the right-of-way on his own car tracks. He says in part:

> We motormen want to make our schedules—we want to carry our passengers to their destinations quickly, and not keep people waiting at points ahead.
>
> Help us to make good records with the company—and good names with the public.

## New Plans Submitted for Handling Freight

Representatives of the Indianapolis Street Railway and of Indiana interurban companies appeared before the Public Service Commission recently to show the necessity for a terminal charge at the freight terminal on Kentucky Avenue. The companies are asking for a charge of 3 cents on each 100 pounds of freight handled.

Under a new contract, which has been entered into, additional buildings will be constructed in ground occupied by the Kentucky Avenue terminal, and practically all freight business will be moved from the Terminal Station. The railway, under this arrangement, will have nothing further to do with freight facilities other than furnishing tracks and power. At the present time the railway owns all the facilities at the Terminal Station and rents them to the interurban companies.

At present the railway is charging 15 cents a car mile for the use of tracks and power and 75 cents a round trip for the use of the Terminal Station. Under the new arrangement, it was explained, the interurban companies will pay between 21 cents and 25 cents a car mile for tracks and power.

The commission, when passing on street-car rates in Indianapolis, called attention of the car company and the traction lines to the present inadequate facilities for handling freight at the present terminal station. The companies were ordered to submit plans for the improvement of the situation, and the Kentucky Avenue terminal station idea was agreed on by the companies. Arthur L. Brady, president of the Union Traction Company, presented the plans for the improvement.

## Wages of Municipal Railway Employees May Be Cut

In preparing the city budget for 1922, members of the City Council of Seattle, Wash., adopted a policy of making a cut of 50 per cent in the blanket increase in pay granted to all city employees in 1919. This action would mean a reduction in the wages of the employees on the Seattle Municipal Railway of 25 cents a day in all cases. The present wage scale is $4.75 for the first three months' service, $5 for the second three months and $5.25 thereafter. This time last year the men asked for an increase of 25 per cent in their pay, but this was denied by the Council. A reduction of wages for trainmen has not, however, been definitely decided upon by the Council.

**Wage Cut Pending Settlement.**—Employees of the Tacoma (Wash.) Municipal Street Railway have signed an agreement which reduces their wages from 3 to 5 cents an hour. The new scale is similar to that in effect on Aug. 1, 1919, providing pay of 50, 55 and 60 cents an hour instead of 55, 59 and 63 cents, which the men were receiving. This cut will be in effect on Aug. 31, pending negotiations.

# News Notes

**May Abandon Line.**—Unless traffic increases on the line of the Asheville & East Tennessee Railroad, which operates between Asheville and Seaverville, a distance of 9 miles, the line will be junked. The preference for jitneys is assigned as one reason for the unsuccessful operation of the electric property.

**Wage Cut on Interurban.**—The conferences between the officers of the Ohio Electric Railway, Springfield, Ohio, and representatives of the trainmen have resulted in an agreement on the wage question. The new scale provides a maximum wage of 49 cents an hour for interurban men, which is a cut of 11 cents an hour from the old scale. The cut for the first year is 8 cents an hour for the first three months and 9 cents an hour for the next nine months. City men will receive a maximum of 46 cents an hour, or 11 cents less than they receive at the present time. The cut for the first year amounts to 8 cents an hour for city men.

**Government Will Appoint Wage Umpire.**—Developments are tardy in the wage situation between the Montreal Tramways and its employees. The men are working under the 12½-per cent reduction put in force on Aug. 16, pending the sitting of the board of arbitration granted on the men's application to the Federal Department of Labor. A. Brossard, chosen as the union representative on the board, and A. P. Frigon, appointed by the Federal Minister of Labor to represent the company on default of the latter to name its own representative, have failed to agree on a third man to act as chairman, and he also will be appointed by the Minister.

## Coming Association Meetings

### Iowa Electric Railway Association

THE Iowa Electric Railway Association will hold its mid-year meeting for operating men at Waterloo, Iowa, Sept. 15 and 16.

### Colorado Electric Light, Power & Railway Association

THE Colorado Electric Light, Power & Railway Association will hold its eighteenth annual convention in conjunction with the second annual convention of the Rocky Mountain Division of the National Electric Light Association at the Hotel Colorado, Glenwood Springs, Col., Sept. 19, 20 and 21. On the same date a meeting of the accounting section of the N. E. L. A. will be held at the Hotel Colorado, and it is expected that members from all over the United States will be present.

# Financial and Corporate

## $44,788,237 Value Found

### Expert for City of New Orleans Revises His Figures Upward More Than $11,000,000

F. W. Ballard, Cleveland, Ohio, expert employed by the commission government of New Orleans, La., to advise it on utility problems, has reported his findings. Mr. Ballard values the properties of the New Orleans Railway & Light Company at $44,788,237, on which amount he says a return of 8 per cent should be allowed. He recommends no change in the rates for energy, but proposes a 7-cent fare and a reduction in the rate for gas to $1.30 per 1,000 cu.ft. He approves the statement of the company that $23,242,000 is needed for improvements during the next five years. He favors the election of residents of New Orleans to the directorate of the company. He recommends an indeterminate franchise for the company. His statement of the value of the various departments of the company is as follows:

| | |
|---|---|
| Railway department | $21,379,414 |
| Electric department | 10,030,071 |
| Gas department | 7,523,365 |
| Total | $38,932,850 |
| Loans to city | 185,000 |
| Unamortized obsolete property | 5,670,387 |
| Total | $44,788,237 |

In the total for the railway department there is an item of $3,342,913 for intangibles, franchises, administration and organization. Mr. Ballard explains that the table does not include anything for going concern value nor any allowance for promotion expenses. He does not believe it would be possible at this time to determine these costs, and points out that in the valuation of 1918 the city took the position of not allowing for these items. He expresses doubt, however, "if we would be sustained in this contention by the courts; the probabilities are that some allowance would be made for these items."

The report of Mr. Ballard has, for the time being, been relegated to the background, a new angle to the controversy having developed as the result of the activities of Commissioner Paul Maloney, of the Department of Public Utilities. Commissioners Roy, Black and Murphy, however, are not unfavorably disposed towards the Ballard report. Even though Mr. Ballard's finding is not absolutely in harmony with their views, they realize that the light and power problem is a matter which should be settled at once, if industrial disaster is to be averted. Mayor McShane sides with Commissioner Maloney in opposing the report.

Commissioner Maloney is for scrapping the Ballard report and breaking off relations of any kind with utility experts. With this idea in view, he propounded a number of interrogations to the city attorney, the gist of which was whether or not the city was not the rate-making power in the controversy. City Attorney Kittredge, in making reply, holds to the opinion that the Commission Council, and the Commission Council alone, is vested with this authority.

This makes for a brand new issue in the matter and has contributed not a little in adding to the complexities of the problem and in increasing the lack of harmony in taking quick action upon the Ballard report. Armed with this opinion, Commissioner Maloney declares the Commission Council has the same authority to fix the rates of fare as the Louisiana Service Commission has to fix the freight and passenger rates over rail lines in the State. He is of the opinion that the New Orleans Railway & Light Company should come to the Commission Council and ask for the rate it wants and that a hearing should then be had to determine the merits of the application.

Thomas F. Cunningham, president of the Board of Trade, in criticising the tardiness of the city in reaching a settlement of the matter, calls the attention of the Commissioners to the fact that, in their failure to reach a solution of the railway problem, they overlook the greater and more important matter to be solved, namely, the rehabilitation of the electric light and power plant.

Mr. Ballard, who reported to the city last year a valuation of $34,586,000 for the property, was retained again by the city, as he expresses it, "to take under consideration the valuations which have been made and to bring these values up to date, to the end that a settlement may be made of the pending actions, or failing that, that my report to you may be one that can, in the light of all the decisions of the courts, be sustained by me in any matters which it may be necessary to litigate."

George C. Earl, general superintendent of the Sewerage & Water Board, has submitted a report to Commissioner Paul Maloney, in which he recommends acquisition by the city of the street railway, electric and gas properties outright at the lowest value the courts will sustain. His report read:

> Every effort I have made to formulate an adequately safeguarded privately-owned utility franchise which would induce capital to undertake to maintain a utility service, is either so unattractive to private capital, or so obviously an unnecessary burden upon the taxpayers that I have ceased to believe that a mutually acceptable and adequately safeguarded franchise is possible.

Figures given out by the New Orleans Railway & Light Company, showing its earnings, appear to bear out Mr. Ballard's estimate of the value of the company and its co-related interests, and the possibility of an 8 per cent return on a valuation of $44,700,000, with a 7-cent fare.

## $43,341 Deficit in Toledo in July

At the regular monthly meeting of the board of control at Toledo, Ohio, it was shown that the monthly deficit of the Community Traction Company, operating under service-at-cost, had been decreased by $9,621, as compared with the previous month, although receipts still show a tendency to decline each month. There was not a quorum of the board of control present at the meeting so all business was held over until Aug. 22. The report, however, was published.

The net result of July operation after payment of operating expenses and credits to the various funds shows a deficit of $43,341. The gross income from all sources was $274,185, a decrease of $2,488 over the previous month. This decrease was less than that noted from month to month. The passenger revenue shows a decrease of $5,321, while revenue from other sources increased. The charge to maintenance and repairs, due to extensive summer work, increased in July by $8,877. Car mileage for the month increased 22,607 miles.

The city lines reflected a reduction in car mileage of 168 car miles while the Toledo Beach line increased the daily average by 205 car miles. During July every line in the city showed a daily loss running from $3 to $137 and the net decrease in riding per day throughout the system amounts to $437.

The commissioner has accumulated a surplus of $79,011 in the maintenance and repair fund and throughout the rest of the year will cut down the monthly credit to this fund so as to leave a reserve of $5,000 by Feb. 1.

The depreciation fund shows $56,666 on hand. There was credited to it during the month $10,625. The whole balance represents cash with the exception of $21,250. The sinking fund, which represents the city's ownership in the property, received a cash payment this month of $17,708, its full allotment for the first time since the ordinance has been in operation. This fund now is at the $106,249 level. Cash credits to the injuries and damages and tax reserves were made, giving each fund a surplus.

## Financial Relief Absolutely Necessary

Whether Manistee, Mich., will continue to have electric railway service will depend upon the decision of the State Public Utilities Commission. Recently the City Council denied the petition of the Manistee Railway for permission to abandon service, but recommended that the company seek relief from the State Public Utilities Commission.

Manager Kressler declared that his company is in real distress financially. He expressed a desire to turn over the lines to the city to operate or to permit the city to dispose of the franchise. The number of passengers carried during June was given as 13,998. The daily receipts range from $28 to $30.

## Havana Income Increased

### Net of the Havana Electric Railway & Light Company Increased Nearly 14 Per Cent

According to the annual report of the Havana Electric Railway Light & Power Company, Havana, Cuba, for the year ended Dec. 31, 1920, the electric railway department contributed 44.2 per cent of the gross earnings from operations, and omnibuses only 0.4 per cent. The balance was from the sale of electricity and gas. The report states that the gain in gross earnings from operation of the entire property were 22.14 per cent greater than in 1919; the total operating expenses 32.9 per cent greater; the total net earnings from operation 11.9 per cent greater, and after deducting United States and Cuban taxes the gain was 13.8 per cent.

### RAILWAY CONTRIBUTES LESS TO INCOME

The relative standing of the railway department has declined seriously. In 1914 it contributed 54.6 per cent of the total net earnings of the company, while in 1919 it gave 40.6 per cent and in 1920 only 30.2 per cent. The marked decrease in 1920 was due mainly to the increase in wages, which form a much larger proportion of the total operating expenses than in the others and for which there has not been time to institute any compensating economies. The loss of earnings during the strike in August also contributed. For several years past the railway has needed cars faster than it was possible to supply them, hence it has lagged somewhat behind the others in the development of possible business.

In connection with this comparison railway operation has materially improved in efficiency, the power used has increased 23 per cent since 1914, while the passenger car miles operated has increased 26.8 per cent and the traffic handled 73.6 per cent. The increase of passengers relative to car miles is too large, which indicates that this service has fallen behind and needs to be extended. Plans for an improved passenger car are now being worked out, and it is expected to increase the capacity, cut down the dead weight, and decrease the time required for building.

An analysis of the statistics as to railway operation shows an increase of 17.5 per cent in the earnings per car mile. This was due entirely to the heavier loading of cars. Even with the new cars added to the service in November and December, the number of passengers per car mile was not reduced and there is no doubt but that an immediate large increase in the number of cars would prove profitable.

STATISTICS OF HAVANA ELECTRIC RAILWAY & LIGHT COMPANY AS TO TRANSPORT OPERATIONS

| | 1920 | 1919 | Per Cent. Change |
|---|---|---|---|
| *Revenues:* | | | |
| Passenger revenue | $4,850,969 | $4,185,488 | 15.8 |
| Other car earnings | 135,860 | 177,610 | *23.55* |
| Miscellaneous earnings | 92,905 | ........ | ..... |
| Stage earnings (animal) | (*a*) | 58,409 | ..... |
| Omnibus earnings | 46,950 | 63,742 | *26.30* |
| Total operating revenue | $5,126,685 | $4,485,249 | 14.2 |
| *Operating expenses:* | | | |
| Maintenance | $653,499 | $454,336 | 43.8 |
| Depreciation reserve | 381,397 | 228,845 | 66.2 |
| Transportation | 2,505,108 | 1,745,569 | 43.5 |
| General | 295,450 | 229,397 | 29.0 |
| Stage expenses (animal) | (*a*) | 61,540 | ..... |
| Omnibuses | 41,511 | 50,925 | *18.5* |
| Total | $3,876,965 | $2,770,612 | 39.8 |
| Net earnings from operation | $1,249,720 | $1,714,637 | *27.1* |
| Taxes | 101,950 | 108,200 | *5.7* |
| Gross income | $1,147,770 | $1,606,437 | *28.8* |
| *Deductions:* | | | |
| Interest | 557,214 | 567,261 | *17.7* |
| Trigo annuities | 3,368 | 3,345 | 0.7 |
| Total deductions | $560,582 | $570,606 | *17.6* |
| Net income to profit and loss | 587,188 | 1,035,831 | *43.3* |
| *Traffic handled:* | | | |
| Passengers carried | 97,019,389 | 83,709,762 | 15.9 |
| Passenger car miles | 13,668,249 | 13,507,527 | 1.2 |
| *Car mile statistics:* | | | |
| Passenger earnings (cents) | 35.49 | 30.98 | 14.5 |
| Operating expenses (cents) | 25.27 | 17.98 | 40.5 |
| Passengers carried | 7.12 | 6.21 | 14.62 |

Difference. (*a*) Sold July, 1919. *Italics* indicate decrease.

## Receivership May Be Lifted

Amicable settlement of the financial affairs of the Memphis (Tenn.) Street Railway is reported to be in a final stage of completion. The actual return of the property to former officials and management of the railway may be deferred for some time owing to the problems which enter into relinquishing the lines, but a public announcement of a settlement is expected this month.

Whether the problem of an increased fare entered into the negotiations between the creditors and the management has not been disclosed. Negotiations between New York capitalists holding paper of the railway and the former management have been in progress for some time and a compromise has been considered from varied angles. There has been much speculation as to the conditions of the proposed reorganization, but nothing definite has been divulged which would tend to disclose upon what terms the various creditors will participate in the reorganization.

## Successor Company at Savannah Chartered

The Savannah Electric & Power Company, Savannah, Ga., has been incorporated to take over after foreclosure and sale the Stone & Webster properties in Chatham County. The new company will have a capital stock of $4,800,000 to be divided into shares of $100 each, of which $1,300,000 will be first preferred stock, $1,000,000 preferred stock and $2,500,000 common stock. The first preferred will be known as debenture stock and entitled to cumulative dividends at the rate of 8 per cent a year, the preferred stock at the rate of 6 per cent. The three classes of stock will have equal voting power.

The incorporators named in the petition are A. A. Lawrence, E. H. Abrahams, Paul Fusillo, John J. Bouhan, Alvah Herzog, H. Mercer Jordan, Lewis A. Mills, Jr., Thomas F. Kearns, W. H. Bedgood and Robert L. Colding.

While no announcement to that effect has been authorized it is generally understood that the formation of the consolidated company foreshadows an application to the United States Court for discharge of the receivership which has continued for more than a year. The reorganization plan was submitted to the stockholders some time ago by a committee, and the formal application for a charter for the new concern indicates that the stockholders have approved the plan. No immediate changes in the policies of the company are said to be contemplated as a result of the reorganization.

The plan for the reorganization was reviewed briefly in the issue of the ELECTRIC RAILWAY JOURNAL for July 30, page 182.

## Receiver's Certificates in Default —Foreclosure Ordered

The property of the Second Avenue Railroad, New York, N. Y., has been ordered sold by the Supreme Court on Sept. 1 in foreclosure proceedings. The sale is the result of judgment obtained for default on principal and interest on $3,140,000 of receiver's certificates. The suit was instituted by the protective committee representing the holders of the receiver's certificate. In addition to the back interest now due, there are back taxes, water charges and other claims of approximately $290,000. The property includes approximately 23 miles of track and a carhouse. The block on which the carhouse is situated comprises fifty-two city building lots. It is assessed at $1,395,000, of which $590,000 is said to represent the value of the land.

**Electric Lines Improve in 1920.**—According to figures recently published by the Wisconsin Railroad Commission electric railways and interurbans operating in that state carried 177,795,571 passengers in 1920 against 161,995,506 in 1919. Total earnings increased from $11,222,239 in 1919 to $14,698,638 in 1920.

## Merger Enabling Legislation Approved

Legislation which will have an important bearing on the electric railway situation in the capital, has been agreed upon by the District of Columbia committee of the House of Representatives. The measure is known as the Woods bill and provides authorization for a merger of the Capital Traction Company and the Washington Railway & Electric Company. It also authorizes a merger of the combined companies with the Potomac Electric Power Company, but precludes any merging of the Washington Railway & Electric Railway Company with the power company.

The bill relieves the railways of the obligation of paying the salaries of crossing policemen, but it levies a tax of 50 per cent on all earnings above 7 per cent of each railway. The gross earnings tax is reduced from 2 to 1 per cent.

In case of a consolidation of the railway with the power company, separate accounts must be kept of income from railway operations and from the sale of power. The Public Service Commission is authorized to pass upon the reasonableness of all expenditures of the railway.

The bill further provides that unless a merger is effected by July 1, 1922, the Public Utilities Commission may establish two rates of fare on the lines of the two companies.

## Strike Loss $1,564,124 in Six Months

During the first six months of 1921 the United Traction Company, Albany, N. Y., suffered a loss of $1,564,124 and a decrease of 18,544,974 passengers carried, according to the report which the railway has filed with the Public Service Commission. Five of the months covered are included in the strike period. The report itself says: decrease between 1921 and 1920 due to strike which started Jan. 29, 1921. Normal conditions have not yet been reached on the lines of this company.

In short, the cost of operating the lines of the United Traction System during the strike period was considerably more than during the corresponding period of last year when normal conditions prevailed.

During the first six months of this year the company carried 4,504,418 whereas in the first six months of 1920 the number of passengers carried was 23,049,392, the loss this year being 18,544,974. During the six months of 1921, one month—January—witnessed operation under normal conditions.

During April, May and June of the current year the passenger revenue was $60,745, while during the same months of 1920 it had been $805,152, thus showing a loss for the quarter this year of $744,406.

Notwithstanding the small income the operating expenses for the quarter were $720,705, as compared with $689,592 in the like quarter of 1920, or an increase of $31,112. The "conducting transportation expense" increased from $347,742 in the quarter of 1920 to $458,712 in the quarter of 1921. This same account shows an increase of $377,419 for the half year. General and miscellaneous expenses rose from $98,587 to $117,058. The net loss for the quarter after deducting all interest charges, was $809,393.

The passenger revenue during the first six months of 1921 was $313,491, and during the corresponding months of last year it was $1,564,958. This year the net loss for the first half of the year was $1,564,124, and during the first six months of 1920 there was a loss of only $102,720.

## Debentures Retired by Texas Electric Railway

The Texas Electric Railway of Dallas, Tex., has filed an amendment to its charter increasing its capital stock from $10,500,000 to $12,660,000, to provide for the issue of $2,160,000 of first preferred stock to retire debentures of that amount. The amendment was filed in the office of the Secretary of State at Austin by Jack Beall, president of the company.

Mr. Beall explained that the increase in capital is not being made with a view to providing capital for improvements or betterments of any kind, but is merely to carry out an agreement made at the time of the consolidation of the Texas Traction Company and the Southern Traction Company on Jan. 1, 1917, under the name of the Texas Electric Railway. At that time a written agreement was entered into that $2,160,000 in debentures would be taken up by an issue of first preferred stock at the end of five years. Most of the new stock issue holders are residents of Dallas and towns along the line of the Texas Electric Railway.

## Transfer of Toronto Railway to City Delayed

Hope has been abandoned of the City of Toronto, Ont., taking over the property of the Toronto Railway on Sept. 1. The arbitration proceedings under which the city will acquire certain of the property of the company prior to its transference to the Toronto Transportation Commission will not be completed until after that date. Partly in consequence of this state of affairs the annual general and the special meetings of the stockholders of the Toronto Railway, fixed originally for Aug. 19, have been postponed to Sept. 30.

In a statement to shareholders, Sir William Mackenzie, president of the railway, said:

> Every effort has been made by your directors to hasten the negotiations for the sale of the company's power and radial interests. The most important questions have now been settled in principle, and the draft agreement submitted by our solicitors to the Hydro Commission has at last been returned with amendments which are now being discussed between our own and the commission's solicitors.
>
> There remain for settlement certain questions in the working-out of the transaction which possess considerable importance, and it will not be possible to have the agreement finally settled and a statement of the effect of it prepared and sent to the shareholders by Aug. 19, which renders a further adjournment essential.
>
> While the delays which have taken place are regrettable it is now felt by your directors that very substantial progress has been made and that the main difficulties have been surmounted. It is confidently hoped that no adjournment beyond the one now indicated will be necessary. but should such be you will be notified at least one week before the date of meeting.

On Sept. 1, when the commission was due to take over the lines, the traffic is at its heaviest on account of the Canadian National Exhibition then being held, and it is, therefore, not proposed to introduce any new routing immediately. In addition certain physical alterations and connections must be made before new cars can be run, or before the lines formerly owned by the city and those of the railway can be connected. These alterations and connections cannot be made till after Sept. 1.

# Financial News Notes

**Deficit Piling Up in Findlay.**—A deficit of $2,036 during July in the operation of the Findlay, Ohio, city lines under service at cost was reported by the Street Railway Commission. The seasonal decline in traffic was advanced as the reason for the drop in returns. The stabilization fund has dropped from $20,000 to $13,001 as a result of monthly deficits since March. For betterment the company has expended $4,200. Fares are now 10 cents cash, seven tickets for 50 cents or two for 15 cents. The cash fare was 8 cents when the new plan was put into operation.

**Plane at Cincinnati Abandoned.**—The Fairview incline plane at Cincinnati, Ohio, has been shut down permanently. Bert L. Baldwin, an engineer who examined the plane, reported recently that the structure was beyond repair and that if that mode of transportation was to be continued the plane would have to be rebuilt entirely. To do that, Mr. Baldwin estimated, would cost the Cincinnati Traction Company approximately $55,000. In view of the cost of replacing the incline and of the fact that it still would continue to be a hazard traction officials agreed to abandon the structure.

**Decrease in "Saltair" Income.**—The Salt Lake, Garfield & Western Railroad, Salt Lake City, Utah, known as the "Saltair Road," in its annual report for 1920, made to the State Utilities Commission, shows an increase in operating expenses of $21,563 over 1919, and a decrease in income of $42,042 compared with the preceding year. The total railway operating revenue for the year was $188,044, an increase of $35,835 over the year 1919. The net revenue from the Saltair beach properties, owned by the railroad, was $15,755, a decrease of $13,685 from the net revenue of the preceding year.

# Traffic and Transportation

## One-Man Cars Saved Tampa

### Manager There Summarizes Lessons of Three Years' Experience With "Katydids"

One-man cars are the biggest factor in maintaining a 5-cent fare in Tampa, Fla., according to T. J. Hanlon, general manager of the Tampa Electric Company, which operates Birney one-man cars on practically every division. The cars, nicknamed Katydids by the Tampa *Tribune*, are proving time savers and nickel gatherers.

"We get many a nickel that we wouldn't," is the opinion of Peter O. Knight, vice-president and general counsel for the company, and the Stone & Webster supervising director for all their Florida properties. He says that the one-man car enables a seven-minute schedule where a fifteen minute schedule was in vogue before, and that the fellows who used to be picked up by passing friends in autos generally find a street car passing before the auto does, and hop aboard.

Mr. Hanlon and Mr. Knight agree that the spirit of fairness which the citizens and their officials have always shown toward the company at Tampa is a factor also in maintaining a lower rate.

Questioned by the correspondent of the ELECTRIC RAILWAY JOURNAL at Tampa as to the reasons why the Tampa Electric Company has been able to continue the 5-cent fare Mr. Hanlon stated that there were several allied reasons for the low fare in Tampa. Among these he declared were the spirit of co-operation existing between the county and city authorities and the company; the division of overhead charges between the lighting and railway department and the introduction of the Birney car.

In speaking of the latter, Mr. Hanlon said:

> I am told that there was considerable comment when the Birney cars first appeared on the streets of Tampa. They were such a complete departure from the open type so long used in this city. Of course, like any other new thing, the only real test is what experience shows. It was not long before the public found that the Birney cars made faster time and came more frequently than the two-man cars they had replaced. This caused the people to patronize the Birney cars more than they had the other cars. This verdict was rendered in the increased number of fares collected, in a way which was unmistakable.
>
> The way the Birney cars appealed to our men was, of course, of importance to us. The matter has worked out to the complete satisfaction of the trainmen. No one ever lost his job due to the Birney cars, because they were introduced gradually and, as a matter of fact, as many men are now employed as when these cars were first introduced. Then again we have put in service more of the Birneys than the number of two-man cars replaced. In addition to the above, we pay the Birney car operator 10 per cent more than other trainmen.

When asked about the effect of the Birney cars on the accident situation, Mr. Hanlon consulted his records. Apparently for the last calendar year the Birney cars in Tampa ran 1,666,135 miles and the two-man cars 1,326,402 miles. The Birneys in that period had 734 accidents, the two-men cars 755 accidents. Hence each Birney ran 2,239 miles before it had an accident, and each two-man car only ran 1,757 miles before it had an accident. Over 27 per cent more miles per accident for the Birneys. Mr. Hanlon said:

> The question you have asked is one that came up continually when the Birney car was introduced in Tampa. We have been operating the Birneys for three and one-half years, so that our statistical record of accidents as between one-man and two-man cars is based on a great deal of experience.
>
> Many people when they see figures like those, think them paradoxical. They think taking one trainman off a car makes its operation more hazardous. On the contrary, the figures showing one-man operation, based on the record of millions of car miles, to be safer than two-man operation, are just what we ought to expect.
>
> Lots of people said that one man couldn't do two men's work. Well, it doesn't work out that way at all. Our men prefer the Birney cars to run on, because they find the work so much more interesting, entirely aside from the 10 per cent extra pay, which helps of course.
>
> To the public the Birney car means more service, quicker service and safer service. To the trainmen it means more interesting and better paid work. To the company it means more economical operation and that in the end helps the public through lower fares. Without these cars the fare would be 7 or 8 cents.

Questioned as to why the economy to the public and company and increased pay to trainmen couldn't be applied to the big cars as well as to the little ones, Mr. Hanlon said:

> That matter is already under consideration. Of course we will first equip the big cars with the same safety devices as the Birney cars have before entrusting them to one man to operate. The results so far have been satisfactory to the public and company and we hope to continue the development of one-man safety operation.

## Trailers Dropped Except During Rush Hours

On account of the loss of traffic owing to jitney and motor bus competition, the Detroit (Mich.) United Railway has revised its car schedule on the Jefferson Avenue line. The interval of time between cars has been decreased and trailers have been dropped except during the rush hours of the day.

While industrial travel has been materially decreased for some time as compared with last year's traffic, due to the reduction in forces at some of the factories, this condition is gradually improving. With the Ford plant in Highland Park running with a record output, but with a decrease in workmen, and other auto plants increasing their forces, industrial traffic is increasing.

While no figures are given out by the Detroit United Railway as to the loss in traffic due to jitney competition, the changes in schedules were made in an endeavor to regain some of the lost revenue and the results have been favorable. The number of jitneys in the city of Detroit has decreased owing to a recent Council ordinance requiring each jitney driver to provide a bond for $1,000.

## Alton Jitneys Restrained

### Public Autos There Required to Suspend by Court—Must Now Secure Proper Certificates

Under the Illinois Commerce Commission law, which holds that a transportation line must be able to certify that it is both a necessity and a convenience, the United States District Court in East St. Louis has put the jitney buses out of business at Alton, Ill. This was accomplished on Aug. 17 when Federal Judge English made permanent a temporary injunction granted in July at the request of the receivers of the Alton, Granite City & St. Louis Railway restraining the several jitney men defendants from operating the buses. The buses threatened by their competition to hurt the railway to an extent that might require it to suspend.

The contention of the defense that interstate transportation was not involved was overruled, the railway being in the hands of receivers. It is now intimated that the bus operators may apply to the Illinois Commerce Commission for permits, but in the meantime the buses have been withdrawn from service.

### RECEIVERS RESORT TO COURT

To the informal representations of W. H. Sawyer and Fred E. Allen, the railway receivers, little attention was paid by the Alton city officials when it appeared that unless something was done to curb the unfair jitney operation the railway must cease business. The receivers had been laying new track and repaving part of the streets in Alton, but the jitneys continued to roll over the new pavement and when it became evident the city officials would take no action, the matter was taken into the Federal court.

The jitneys were not operated by transportation companies and had no authority from the Illinois Commerce Commission. The railway fare is 8 cents. The jitneys were charging a nickel. They took the cream of the short haul traffic. They did not operate at all hours. They left the traffic of the dull periods for the railway. These are merely some of their sins.

As soon as the buses quit, the revenue of the street cars in Alton showed a decided gain. It is still too early, however, to indicate just how much average increase in fares will result from the stopping of unfair competition. Mr. Sawyer says he hopes the passing of the jitneys will put the railway in a position to carry out its improvement plans and operate successfully. If the jitney men go before the Illinois Commerce Commission they can be compelled to pay taxes as transportation companies and be forced to obtain permits, which may take much time.

## Jersey Hearing Postponed

### Argument on Appeal of Public Service Railway to Ignore Commission Ruling Put Over to Sept. 13

Judges Rellstab and Davis, sitting together in the United States District Court at Trenton, N. J., on Aug. 18 denied the motion made to dismiss the proceedings in the Public Service Railway fare case and the motion to include as defendants in the suit the municipalities served by the railway. Later the judges modified this order to the extent of recognizing the cities as "friends of the court." In this way they have opened means for the participation of the cities in the conduct of the case to an extent that may make it unnecessary for the municipalities to renew their appeal to intervene as full fledged parties to the proceedings.

At the close of the session of the court on Aug. 18 it was decided to hear final argument on Sept. 13. The appeal of the railway is for an order from the court which will prevent interference with the company collecting a 10-cent fare. The Board of Public Utility Commissioners recently decided that a 7-cent fare with a 2-cent transfer charge should be established in place of the then existing 7-cent fare with a charge of 1 cent for each transfer.

Most of the session on Aug. 18 was given over to argument of L. Edward Herrmann, counsel for the Public Utilities Commission, who contended that the Public Service was not attacking the constitutionality of the state utility law, therefore could not appeal under Section 266 of the federal judiciary act.

This was admitted by Robert H. McCarter for the company. He then pointed out to the court that Section 266 as amended in 1913 provided that this statutory court could issue an injunction restraining enforcement or execution "of any order made by an administrator or commission acting under and pursuant to the statute of such state."

The court said it had no authority to act then inasmuch as the statute required three judges to sit. Judge Rellstab said, however, that he would deny the motion, reserving the right for Mr. Herrmann to appeal to the full court when it convenes Sept. 13.

## Interurban Seeks to Restrain Autos

Judge Cross of the Ottawa County Circuit Court, sitting at Grand Haven, Mich., on Aug. 6, refused to issue a temporary injunction restraining motor buses and motor freight vehicles in competition with Grand Rapids, Grand Haven & Muskegon Railway from operating until the suit brought by interurban against operators of bus lines could be tried. Judge Cross' decision permits stage lines to operate until the case can be tried in Circuit Court on its merits.

The bill of complaint filed by the railway alleged that the defendant motor lines were operating in defiance of the laws of the State regulating the operation of stage coaches over the highways; that the operators of the motor vehicles named do not hold franchises from the cities and villages through which they pass, as required by the stage coach law, and that certain of the operators have failed to comply with provisions of the law.

The bill states that the Grand Rapids, Grand Haven & Muskegon Railway's earnings have been greatly decreased and that the investment in the railway is jeopardized by the unfair and unregulated competition of the autos.

## Increased Service Offered If Jitneys Are Regulated

The Indiana Union Traction Company has submitted to the City Council of Muncie, Ind., a proposal to give Muncie a service with cars as frequently as seven minutes apart, and not farther apart than twelve minutes, in place of the present fifteen and twenty-minute service. The company asks in return the enactment of an ordinance forbidding jitneys to operate in the streets occupied by the railway and giving the company permission to construct a line in Madison Street from Kiby Avenue to Fifth Street, this being an extension of the Heekin park line, for the purpose of making two loops in the eastern and southern part of town. Under the ordinance suggested there would be nothing to prevent jitneys from operating in the territory served by the railway as long as the automobiles do not use the streets in which the railway operates.

## Fare Case at Birmingham Appealed by City

Formal notice of appeal from the decision of the Alabama Public Service Commission granting an 8-cent fare with a 2-cent transfer charge has been filed by the city of Birmingham with the Public Service Commission.

Under the public utilities act, adopted by the last Alabama Legislature, all appeals from decisions of the Alabama Public Service Commission must be made to the Circuit Court of Montgomery County. Appeal may then be taken from that court to the Supreme Court.

Records of the hearing of the application of Lee C. Bradley, receiver for the Birmingham Railway, Light & Power Company, which resulted in the granting of the increased fares, will be certified to the Circuit Court of Montgomery. The case will be set in regular order before the judge sitting in the Chancery division.

City officials state that the validity of the Public Utilities bill, giving the Alabama Public Service Commission exclusive right to regulate fares charged by public utilities of the state, will be attacked by separate proceedings, which they say will be filed in court in a short time.

A ticket provision of the order of the Public Service Commission, by which the railway sells fifteen tickets for $1, is proving popular in Birmingham. The tickets are being used very extensively by regular patrons of the system.

## Straight Fare in Memphis

### Memphis Goes to Seven Cents With No Ticket Sales—Riding Still Falling Off—Wages Cut

Passengers on the cars of the Memphis (Tenn.) Street Railway were greeted on Aug. 19 with the announcement that the sale of ten tickets for 65 cents had been discontinued that thereafter a straight 7-cent fare would apply. Tickets already purchased will be received as fare during the month and after Sept. 1 they will be redeemed at the purchase price.

One year and one day before, the fare had been advanced from 6 cents straight to 7 cents, with ten tickets for 65 cents. The average fare per passenger received under the plan that has now been discontinued was 6.9 cents, so that the elimination of the sale of tickets will, if traffic holds up, add but little to the revenues of the company. Traffic during August has been at the lowest point reached during the year. If traffic conditions improve the receivers are hopeful another advance may be avoided, but if conditions do not change for the better an advance in fare to 8 cents cash, with ten tickets for 70 cents, is in prospect. Two months must elapse, however, before another change in the rate can be requested.

### 20,000 FEWER PASSENGERS IN JULY

The increase in fare was not altogether unheralded in advance, for officials of the railway had recently referred inquiries about the fare prospects to the record in the recent wage arbitration and to further declines in gross revenue during July. Operations for July in Memphis added $20,559 to the deficit in the fare index fund, as compared with $15,056 for June. The company carried 20,345 fewer passengers in the thirty-one days of July than it did in the thirty days of June. The total deficit to date from Aug. 1, 1919, is $200,318.

The receivers admit that they were much disappointed at the recent wage award, which resulted in a cut of 4 cents an hour in the pay of trainmen. The receivers asked a reduction of 12 cents an hour. Based on July's business, the cut of 4 cents an hour would have saved the company about $4,800, while the cut of 12 cents asked by the management would have saved about $15.000.

In his testimony before the wage arbitration board, T. H. Tutwiler, receiver for the company, stated that the receivers for the company refrained from increasing the fare on July 1 because they expected a substantial reduction in wages, in keeping with the reduced cost of living.

The order under which the receivers are operating provides that: In the emergency that the fare index fund continues to decrease for two succeeding months after an increase in the rate of fare, then the commission may announce an emergency change in the rate of fare and put into effect the next indicated rate of fare forthwith.

### New Bus Routes Authorized in Washington

Extension of the Washington (D. C.) Rapid Transit motor bus service over four new routes has been authorized by the Public Utilities Commission. The commission took its action at the request of the bus company. In its petition to create the new routes, the bus company stated that "after five months of practical experience we have accumulated figures which, in our opinion, warrant additional bus lines in this city." In extending the bus lines, the commission also allowed an increase in the number of passengers the machine can carry to thirty-two—twenty-one seated and eleven standing. The transit company asked the commission to increase the number of passengers to thirty-five, but the commission ruled that such an increase would overload the machines.

### Bus Company Enlarges Operation

The Selectmen of Saugus, Mass., have granted to the Lynnfield Community Bus Company, Inc., a license to operate in North Saugus through Spring Street or Walnut Street to the Lynnfield lines. This license was granted at the behest of the North Saugus Improvement Club, which requested that the Lynnfield bus be allowed to run in opposition to the motor bus service started on Aug. 1 by the Eastern Massachusetts Street Railway, which has since been taken off, from the terminal of the car line at the Lynn city limits to Corbett's Square, North Saugus.

The motor bus line of the railway did not prove popular with the North Saugus residents. They have preferred to walk a distance and pay a higher fare to ride on the Lynnfield Community bus rather than patronize the motor bus operated by the railway.

This bus line covers a part of the territory once served by the trolley line from Lynn to Wakefield. The trolley abandoned operation some time ago.

### Detroit Bus Company Builds Own Garage

A new garage for the Detroit Motor Bus Company is being rapidly pushed to completion. The building is located at the foot of Terminal street. It will be 120 ft. x 140 ft. in dimensions, one story high. The materials being used in erecting it are brick and steel. The estimated cost is $75,000.

W. S. Evans, president of the Detroit Motor Bus Company, announces that seventy buses will soon be in operation in response to the wide demand for the opening of additional routes in various sections of Detroit. The service furnished by the company has become remarkably popular, so much so that crowds around some of the stations become so dense at times during the evening hours that it is altogether impossible to accommodate the waiting passengers. Practically every part of the three routes now being traversed by the buses follows street car lines but future plans provide for a network of bus lines covering the residential sections.

### 900 Buses Dispatched a Day from Seattle Terminal

The Motor Transportation Service Company, Railway Exchange Building, Seattle, Wash., announces that the conversion of the old fire station at Third Avenue and Pine Street into a motor bus terminal will be completed in about thirty days. New loading and unloading platforms will be provided. When completed, the station will be the terminus for every motor bus concern operating from Seattle. About 900 motor buses will enter and leave the station in a twenty-four-hour day. G. R. Sumpter is president of the company.

### Key Route Gets Permission to Operate Motor Buses

An ordinance has recently been passed by the city of Oakland, Cal., permitting the San Francisco-Oakland Terminal Railway to extend its service on the West Sixteenth Street and Piedmont Avenue lines by using the motor bus. Passage of the ordinance by the City Council was necessary inasmuch as a previous ordinance restricted the operation of jitney buses. The operation of motor buses under the present regulation extends transportation service from the termination of the existing electric railway lines.

### Motor Companies Slow to Comply With Law

The Graham law, which classifies inter-city motor bus lines as public utilities and makes them subject to regulation of the Public Utilities Commission of Ohio, is being complied with only half-heartedly. As a result the commission is about to begin an investigation to ascertain why so few of the 500 or more bus lines operating in the State have filed tariffs. At the time the law went into effect on Aug. 15 only six lines had filed their tariffs and only two of these conformed to regulations. A fine of $1,000 a day is provided for negligence in filing tariffs.

The commission has drafted a set of rules for the bus lines which makes it mandatory for them to file time tables, maintain established routes, run on regular schedules, etc. Annual reports covering financial and operating transactions are required to be made.

### Bus Service Out of Columbus

The Ohio Motor Bus Company, now operating a bus line between Columbus and Westerville, started a new line from High and Broad Streets, Columbus, to Bexley on Aug. 1. The buses operate from 6 a. m. until midnight, but it is planned to establish an "owl" service. The fare is 5 cents to Franklin Park and 10 cents to Bexley. An 8-minute schedule is operated during the rush hours.

### Trolley Freight Between Camden and Trenton

The Public Service Railway will establish freight service between Trenton and Camden, N. J., beginning Sept. 1. The rates have not yet been announced. Stations will also be established at Palmyra, Riverside, Beverly, Burlington, Florence, Roebling and Bordentown. There will also be "curb stone" stops at Delair, Cambridge, Plaza Park and Fieldsboro. Proprietors of garages near these stops will be made special agents. Provisions will be made for persons to have freight picked up at places along the line which are not designated as freight stops.

## Transportation News Notes

**Trackless Trolley Demonstrated in Norfolk.**—The trackless trolley, which has been in use on the lines of the Virginia Railway and Power Company in Richmond, Va., has been moved by the company to Norfolk, Va., where the value of the vehicle is being demonstrated to the public.

**Ticket Fares Cut by Suburban Line.**—The board of directors of the Homestead & Mifflin Street Railway, Homestead, Pa., has ordered a reduction in the cost of ticket fares. Strip tickets which now sell at fourteen for $1 will sell at sixteen for $1. Cash fares will remain at 8 cents.

**Temporary Rates Extended.**—Temporary rates of the Fargo-Moorhead Street Railway, Fargo, N. D., have been extended to Sept. 3. This is pending a decision in the case, through an order issued by the State Railroad Commission and officially announced in its last bulletin. The rate is 7 cents.

**Fares Advanced to Ten Cents.**—The Public Service Commission has given permission to the Alabama Power Company to charge 10 cents on its lines in Huntsville. The company was operating on a 7-cent fare granted last year and proved that this rate produced a very small increase in revenue.

**Jitneys Barred from Railway Streets.**—The City Council of Aberdeen, Wash., recently passed an ordinance barring jitneys from all streets served by lines of the Grays Harbor Railway & Light Company. Jitney interests have secured legal representation, and it is stated the matter will be carried by them to the courts.

**$10,000 Addition a Month Expected.**—The increase in ticket fare at Toledo, Ohio, from eight for 50 cents to six for 40 cents, which went into effect on Aug. 20, is expected to yield about $10,000 a month additional revenue. Officials of the Community Traction Company believe that by next spring fares will begin to return step by step back to a nickel fare.

**Rerouting to Expedite Traffic.**—The City Council of Indianapolis recently accepted three proposals for rerouting interurban cars and West Washington Street cars. The recommendations were put into effect on June 26. Interurban routes have been changed so as to eliminate traffic from the already congested trunk lines on Virginia and Massachusetts Avenues.

**City Answers Fare Petition.**—In answer to the petition of the Durham (N. C.) Public Service Company before the Corporation Commission for a 10-cent fare, the city attorney has prepared a request for a reduction in fares from 8 cents to 7 cents. The city contends that an increased fare will work to the detriment of the company since there has been a notable decrease in passengers carried since the fare was advanced from 7 cents to 8 cents.

**Ten-Cent Units Desired.**—The Millville (N. J.) Traction Company has applied to the Public Utility Commission for permission to increase its rates from 7 cents to 10 cents. Last year the company abolished commutation tickets and the fare from Millville to Vineland was increased from 10 to 14 cents. The company recently took up its tracks from Millville to South Millville due to heavy losses. The hearing is scheduled for Sept. 6 at Trenton.

**Plea Made for Jitneys.**—Fifteen thousand persons, most of whom reside in the south and west sections of Indianapolis, are said to have signed a petition requesting the City Council to refrain from eliminating the jitney. The petition is being held in readiness for presentation to the Council in case the ordinance to regulate jitneys is called out of committee. The petition said: "We know what the street car service was prior to the introduction of the jitney and what it will be again if you permit the jitney to be abolished."

**1,300,000 Fewer Passengers a Month.**—The Cincinnati (Ohio) Traction Company has cut its service about 10 per cent because the company is handling 1,300,000 fewer passengers each month this year than during the corresponding months last year. Normally about 12,000,000 passengers are carried each month. Walter A. Draper, vice-president, in explaining the action taken by the officials of the company, said the closing of several large factories in the industrial centers was responsible for the curtailment of service.

**City Will Not Act.**—The City Commission of Hoquiam, Wash., after consideration of the drafting of an ordinance denying to jitneys the use of certain streets, as requested by the Grays Harbor Railway & Light Company, has announced that it will take no action in the matter. The commissioners state, in part: "From an examination of the ordinance submitted, it is apparent that the ordinance, if passed, would absolutely prohibit the operation of stage lines between this city and Aberdeen, as well as local jitneys. Under the form of city government here, it is possible for a petition to be filed initiating an ordinance whereby the same may be submitted to the voters of the community for acceptance or rejection."

**Eight-Cent Zone Rate Allowed.**—The State Public Utility Commission of New Jersey has dismissed the application of the New Jersey & Pennsylvania Traction Company for an increase from 7 to a 10-cent fare in each of its four zones between Trenton and Princeton, but allowed the company an increase of 1 cent for each zone, making cash fare 8 cents. The company, however, is directed to sell four tickets for 30 cents. The rate of fare within the Trenton city limits must remain at 3 cents, the company's franchise containing a clause to that effect. School children may buy commutation tickets to be used on school days at the rate of twenty-five tickets for $1.

# New Publications

### Steam Boiler Engineering

Twenty-seventh edition. Published by the Heine Safety Boiler Company, St. Louis, Mo. Cloth, 6 x 9 in., 639 pages, 400 illustrations.

Combined in this twenty-seventh edition of "Helios," which summarizes the latest commercial developments in boiler design practice, are the experience of both the technical staff of the Heine Safety Boiler Company and other eminent authorities. Covering all the phases of boiler practice from design to installation, tests and operation, it contains all the data and information of the company's long experience, to which is added sufficient theoretical explanation for clarity, so that the book is very valuable to any steam engineer.

### Analysis of Electric Railway Problem

By Delos F. Wilcox, Ph.D., 809 pages. Published by the author. New York City.

At the conclusion of the hearings conducted in 1919 by the Federal Electric Railways Commission, the services of Dr. Wilcox were engaged by the commission to aid it in analyzing the testimony gathered and to make suggestions to the commission with reference to its report. The analysis thus prepared by Dr. Wilcox forms the greater part of the book under review. The plan followed has been to group selected parts of the testimony under appropriate chapter headings and discuss the points made. Altogether there are fifty-four chapters in the book.

Dr. Wilcox frankly says in his preface, "My analysis of the evidence presented to the Federal Electric Railways Commission confirms me in the opinion that no permanent solution of the electric railway problem, consistent with public interest, is possible except in public ownership." This viewpoint is naturally presented throughout the volume and is set forth in the fifty-four conclusions in Dr. Wilcox's summary, which forms part of the fifty-fourth chapter entitled "Public Ownership and Operation the Ultimate Solution." The author does not hesitate to admit that there are many difficulties in the establishment of even this solution. Thus, our governmental structures, in large measure, are unsuitable for the assumption of this responsibility. Railway properties extend beyond the boundary lines of municipalities and other political subdivisions. Municipal powers for incurring debts are largely exhausted. There is lack of free development of constructive policies in public administration. Nevertheless, he thinks that many of these difficulties are artificial and can be removed in time and that the proper policy now is to direct attention toward the removal of the legal, financial and administrative barriers now opposed to this objective.

From these comments the idea must not be derived that Dr. Wilcox's book is only a plea for municipal ownership and operation. It contains many interesting facts taken from the stenographic reports of the meeting and arranged under logical heads for discussion and comparison. These include statistics of the results of fare increases during 1917, 1918, and 1919, taken from a data sheet sent out by the secretary of the commission in December of the latter year, a list in tabular form of the strikes on the principal electric railway systems in the United States during 1919, giving date and duration of strike and approximate loss in revenue, a table giving wages of employees on unionized properties, etc. Six chapters are devoted primarily to different phases of the labor problem. One of these is entitled "the union labor program" and describes the plan put forth by the union officials at the hearing, and one is entitled "the right to strike," a weapon which the author thinks should be taken away, as the public's right to have local transportation service go on without interruption is paramount.

There are two appendices. One is a discussion of the local transportation issues in New Jersey in the form of a report transmitted to Governor Edwards on July 19, 1920. The other is a discussion of the Denver traction situation in the form of a report prepared for a civic commission in Denver.

On the whole railway officials will find much to interest them in the book.

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## Fare Increase Allowed in Minneapolis

The petition of the Minneapolis Street Railway, filed on June 24 and heard on Aug. 23, for a cash fare of 7 cents and four tickets for 25 cents, has been granted by the state commission, effective on Sept. 1. Further action of the city to take the matter into the courts depends on the orders of the council. The hearing of a similar request for an emergency advance in fare by the St. Paul City Railway was begun on Aug. 25.

# Personal Mention

## J. H. Sundmaker Resigns

### Chief Engineer of Ohio Electric Opens Consulting Engineering Office in Cincinnati

After an absence of eight years from Cincinnati J. H. Sundmaker, widely known in the engineering world, has returned to his birthplace and is now in private practice as a consulting engineer, with offices in the Union Trust Building. During these eight years Mr. Sundmaker was chief engineer and director of all subsidiaries of the Ohio Electric Railway, with headquarters at Springfield, Ohio.

Mr. Sundmaker's resignation as chief engineer of the Ohio Electric lines was effective on July 31. G. D. Nicoll, assistant chief engineer, took over the supervision of the engineering work when Mr. Sundmaker left. It is understood that Mr. Sundmaker's place will not be filled and that Mr. Nicoll will retain his present title as assistant chief engineer.

Mr. Sundmaker has been identified with the Ohio Electric lines for the last eight years. Millions of dollars have been spent in the improvement of these lines under his direction. Mr. Sundmaker is optimistic about the future of interurbans. He believes that the Ohio Electric lines can be made to pay a good return, notwithstanding the general use of the automobile and the motor truck. As he reviews the past and looks into the future he states that he feels that the interurbans have come to stay and that no amount of competition can interfere with their successful operation if business is coaxed and expenses are reduced.

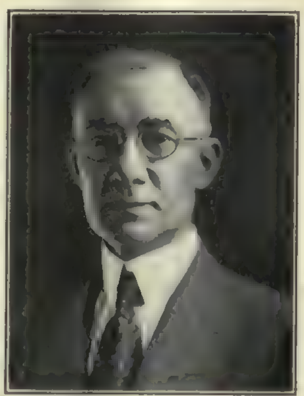
Since taking up his position as chief engineer in 1913, the year that the great flood swept that section and caused great damage to property, including that of the Ohio Electric Railway, Mr. Sundmaker has been steadily at work building up the system. Notwithstanding the present financial situation in which the roads are involved, the lines are considered in splendid shape for service. With the expenditure of a limited amount of money it is pointed out that the roads can be made to give a substantial return on the investments, after the general readjustment contemplated.

Mr. Sundmaker states that if the tracks of the Ohio Electric Railway and the other lines operating in connection are placed entirely on private right-of-way and attention paid to increasing business the interurbans can be reorganized on a paying basis. He says that every means should be adopted to move tracks from locations where expensive construction is necessitated, such as in paved streets.

Mr. Sundmaker has the honor of building the longest single span highway bridge in the United States. The new bridge was built in 1906 across the Big Miami River at Elizabethtown, Ohio. It is claimed that this is the longest single span structure of its kind ever erected. It is 600 ft. long.

On Nov. 3, 1909, announcement was made in Cincinnati that City Engineer J. H. Sundmaker had prepared a most comprehensive and important proposal for the welfare and advancement of Cincinnati, which would be submitted at the next meeting of the City Council. This contained detailed specifications for Cincinnati electric lines and a union depot scheme for steam roads.

Mr. Sundmaker has always lived in Ohio. Born in Cincinnati, he received his early education in the primary and elementary schools of that city. Along in 1887 he entered an engineering class conducted by Prof. William Eisele, under what was known as the "co-operative plan of working and studying at alternate periods, which is now in operation at the University of Cincinnati, the idea having been copied from Professor Eisele. Completing his education under the guidance of Professor Eisele, Mr. Sundmaker associated himself with Col. E. F. Jewett in general engineering work. Later he became engineer for Hamilton County, of which Cincinnati is a part. During the administration of Mayor Leopold Markbreit from 1908-1909 Mr. Sundmaker was city engineer of the city of Cincinnati.



J. H. SUNDMAKER

When Dr. Charles Schwab was elected Mayor he appointed Mr. Sundmaker Director of Public Works, which position he held from 1910 to 1911. In 1913 Mr. Sundmaker went to Springfield and took charge of operations of the Ohio Electric Railway and its subsidiaries.

## Mr. Crowley General Storekeeper of International Railway

R. J. Crowley has been appointed general storekeeper of the International Railway, Buffalo, N. Y. Mr. Crowley joined the International Railway in 1918 as general clerk to the superintendent of equipment. At one time Mr. Crowley was in charge of furnishing material for the large construction work on the fire equipment department of the Interborough Rapid Transit Company. Previous to that he was with the Norton Company at the time of the electrification of the various street railways of New York City and also during the building of the Long Island Traction Company.

## "Bill" Goodwin Receives Loving Cup

The presentation to W. L. Goodwin of a huge silver loving cup as a token of esteem and devotion introduced a personal note into the annual outing of the Independent Associated Electrical Contractor-Dealers held at Grant City, Staten Island, on July 30. Mr. Goodwin, who is assistant to the president of the Society for Electrical Development, was the guest of honor and the presentation of the silver loving cup came as a complete surprise to him. He made acknowledgment in a characteristic speech, assuring the donors that while the spirit which prompted the gift was fully appreciated, he considers his efforts a duty and a pleasure, and entertains no thought of obligation on the part of those who enjoy the benefits.

**E. F. Weber** has been appointed soliciting agent of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., as a successor to L. G. Vetter.

**C. M. Bange**, has been appointed master mechanic of the Interstate Public Service Company, with headquarters at Scottsburg, Ind., to succeed H. H. Buckman, whose resignation was announced in these columns on Aug. 6.

**Kazutada Sakurai**, equipment engineer Tokyo Municipal Bureau of Electricity, Tokyo, Japan, is making a tour of the United States for the purpose of studying the electric railways. He is particularly interested in car building, car repair shops, car houses, etc.

**Prof. Arthur M. Greene**, of Rensselaer Polytechnic Institute, has accepted the call of the trustees of Princeton University to become dean of the engineering school and professor of mechanical engineering. He will take up his new duties in September, 1922. Prof. Greene is a graduate of the University of Pennsylvania and also holds an honorary degree of D.Sc. conferred in 1916. He has taught mechanical engineering at Drexel Institute, at the Universities of Pennsylvania and Missouri, and at Rensselaer. He has been prominent in the American Society of Mechanical Engineers as manager and vice-president and at the present time is chairman of the research committee.

**C. D. Emmons** has succeeded F. E. Farwell as secretary of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa. The positions of claim agent, electrical engineer and road master are now being filled respectively by R. G. Murray, S. J. Fairbanks and C. Formaker.

**J. C. Hector** resigned in July from the position of assistant treasurer of the Bellingham Division of the Stone & Webster interests in the Puget Sound territory. His resignation has opened the way for the advancement of C. E. Stroop, chief clerk in the office of W. E. Best, assistant treasurer of the Seattle Division, to the vacant Bellingham position. Mr. Stroop will be succeeded in the Seattle offices by W. N. Ringrose, of the Bellingham offices, who assumed his new position Aug. 1. Mr. Hector, who was among the most popular figures in the Bellingham organization, has gone to California, where he has joined a brother-in-law at Los Angeles, in the operation of a group of producing oil wells.

## Obituary

**R. T. Lozier**, consulting electrical engineer in New York, died Aug. 21, of pneumonia. He was 52 years old. Mr. Lozier was connected from 1883 to 1890 with the Edison interests. Later he was associated with the Allis-Chalmers Company.

**W. C. Rogers**, retired Cincinnati business man who, during his two terms as representative from Hamilton County to the Ohio Legislature from 1892 to 1896, fathered and put through the Rogers Bill, granting a fifty-year franchise to the Cincinnati (Ohio) Street Railway, died at Oakland, Cal. Mr. Rogers, who was seventy-five years old, was well known in Cincinnati as a theatrical producer, and a leader in the coal business. The fifty-year franchise, which Mr. Rogers was responsible for obtaining for the traction company, has been the center of discussion during the controversy that has recently been taking place between the city of Cincinnati and the company.

**Epes Randolph**, president of the Arizona Eastern and the Southern Pacific de Mexico, and one of the pioneer railroad men of the Southwest, died on Aug. 22. Spending his early years in the West, he was assistant engineer for various railroads in the South and Mexico from 1876 to 1885, and as engineer from that time until 1895, when he was superintendent of Southern Pacific lines in Arizona and New Mexico. From 1901 to 1904 he was vice-president and general manager of the Los Angeles Railway and Pacific Electric Railway, and held the same positions later in other railway companies until 1911, when he was appointed to the positions he held at the time of his death.

# Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE
MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

## Increase in Coal Production

### Current Rate Is Still a Million Tons a Week Behind the 1914 Average for Corresponding Period

For the first time in two months the production of soft coal has turned definitely upward. The output during the second week of August is estimated by the Geological Survey at 7,726,000 net tons. Not only was this an increase of 551,000 tons over the output of the week preceding, but it was the largest attained in any week since June 11, though the present rate of production is below that in other recent years. In the corresponding week of 1917 over 10,100,000 tons was produced; in 1918 the figure was 11,770,000 tons; a year ago it was 11,813,000. In 1919, a dull year for the coal trade, the corresponding week showed 9,100,000 tons. Even in 1914, a year of business depression, the August output averaged 8,700,000 tons a week. Before the current rate of production can equal even the 1914 rate it must be increased almost another million tons a week.

Production of soft coal during the first 190 working days of the past five years, the period over which records of weekly output extend, has been as follows:

| Years of activity | Years of depression |
|---|---|
| 1917....337,591,000 | 1919....273,403,00 |
| 1918....359,409,000 | 1921....241,548,00 |
| 1920....320,807,000 | |

It will be seen that the year 1921 is in round numbers 32,000,000 tons behind 1919, 79,000,000 tons behind 1920, and about 107,000,000 tons behind the average of the war years. Compared with the average of all four years, it is 81,000,000 tons behind.

Undoubtedly the largest factor in this subnormal production is a decrease in consumption resulting from the depressed condition of industry. The latest month for which consumption data are available is May, 1921. In that month the consumption for railroad fuel was probably only 81 per cent of the 1920 average; for electric utilities, only 78 per cent; and for coke manufacture, only 38 per cent. Exports in May, 1921, were but 87 per cent of the 1920 average.

## Storage Battery Demand Mostly for Replacements

Buying of storage batteries for control and lighting of multiple-unit trains is of about normal activity, according to manufacturers' reports. There has been the usual steady but not large volume of orders from railways for replacements. This type of battery, designed to furnish the power for operating the control circuit of all multiple-unit equipment, such as electric locomotives, subway, elevated and interurban trains, depends for its sales largely of course, upon the purchase of new equipment. It is stated by battery manufacturers that a large sale of new equipment is not to be expected just now, but they are looking forward optimistically to business that will accompany the purchase of electric locomotives for heavy traction work.

Prices of batteries have not changed materially since the first of the year when they took a slight drop. They have followed very closely, the trend of labor and raw material prices. The present price of lead, at present 4.4 cents, is about one-half of what it was a year ago, though prices several months ago were a fraction of a cent lower than they are now.

## Portland Cement Production Increases in July

More cement was produced in the United States in July than in June, and more cement was shipped than was produced, according to figures prepared under the direction of Ernest F. Burchard of the United States Geological Survey. Both production and shipments in July exceeded the average for July in the last five years.

The production for the first seven months of 1921 is more than 97 per cent of the quantity manufactured in the corresponding months of 1920 and more than 52 per cent of the total production in 1920; the shipments are more than 96 per cent of those for the corresponding period of 1920 and more than 52 per cent of those for the whole year 1920.

Stocks at the end of July were over 1,470,000 bbl. larger than on Dec. 31, 1920, and a little above the average for July in the five preceding years, though somewhat less than at the end of June. The production of finished Portland cement for July was 9,568,000 bbl., while the number of barrels shipped was 10,301,000.

The production of clinker (unground cement) during the seven months amounted to more than 53,000,000 bbl., and the July production exceeded 9,000,000 bbl. July stocks of clinker are reported as more than 4,300,000 bbl.

## Electric Railway Proposed for Japan

Application has been made to the government of Japan, according to *Electrical Industries*, for a charter to build a high-speed electric railway between Tokyo and Nikko, a distance of eighty miles.

## Rolling Stock

**Centralia (Ill.) Traction Company** has purchased two new safety cars built by the Cincinnati Car Company and purchased from the National Safety Car & Equipment Company, St. Louis. The Centralia & Central City Traction Company has also bought two cars of the same make from the same firm.

**The Columbus (Ga.) Railroad Company** has given out the following information on the four safety cars which were recently ordered from the St. Louis Car Company as previously mentioned:

| | |
|---|---|
| Number of cars ordered | 4 |
| Date of delivery | Oct. 15, 1921 |
| Builder of car body | St. Louis Car Company |
| Type of car | Single-truck safety |
| Seating capacity | 32 |
| Weight | 16,000 lb. |
| Length over all | 28 ft. ½ in. |
| Truck wheelbase | 8 ft. |
| Width over all | 8 ft. |
| Height, rail to trolley base | 9ft. 9 in. |
| Interior trim | Bronze and mahogany |
| Roof, arch or monitor | Arch |
| Air brakes | Westinghouse |
| Armature bearings | Ball |
| Axles | 3¾ in. O.H. steel, heat treated |
| Car signal system | Faraday |
| Car trimmings | Bronze |
| Couplers | Flat steel, 1 in. x 2½ in. |
| Curtain fixtures | Curtain Supply Company (Pantasote) |
| Curtain material | Double-faced Pantasote |
| Designation signs | Hunter illuminated |
| Door operating mechanism | Air or hand lever |
| Fare boxes | Johnson |
| Fenders or wheelguards | H&B lifeguards |
| Gears and pinions | General Electric |
| Hand brakes | Steel tubing with ratchet wheel |
| Heater equipment | None |
| Headlight | Golden Glow |
| Journal bearings (if ball or roller) | Roller |
| Lighting arresters | General Electric |
| Motors, type and number | GE. 258C |
| Registers | International |
| Sash fixtures | Compression springs |
| Seats | Haywood Brothers and Wakefield Company |
| Seating material | Wood slats |
| Step treads | Feralun, 3 in. wide |
| Trolley catchers or retrievers | Ohio Brass Company |
| Trolley base | Ohio Brass Company |
| Trucks | St. Louis Car Company |
| Ventilators | Utility Ventilation Company |
| Wheels (type and size) | Rolled steel 16 in |

## Track and Roadway

**British Columbia Electric Railway, Vancouver, B. C.,** has completed the repaving of Government Street with regard to the relaying of the tracks. Within a short time the city will complete the laying of the asphalt.

**Los Angeles (Cal.) Railway** will start soon on the reconstruction of Spring Street from First to Seventh Streets. The work will include the installation of new ties and rails and the leveling of the roadbed. The present 72-lb., 6-in. rail will be replaced by 116 lb., 7-in. girder rail. Construction work on Maple Avenue from Washington Street to Santa Barbara will be completed shortly.

**Savannah (Ga.) Electric Company** will spend $40,000 in extensions to the Tri-State Exposition Grounds, a distance of about 3½ miles. Work will be started as soon as the franchise is granted. It will be necessary to build double lines of tracks on West Broad Street from the present double line terminal at Thirty-ninth Street, south to Forty-fifth Street, and a single line, with turnouts, on Forty-fifth to the fair grounds, where a terminal will be made between the Morehouse and Johnson buildings, with a loop in the fair grounds.

**Alton, Granite & St. Louis Traction Company, Alton, Ill.,** is making extensive improvements in Alton. Work on track renewal is in progress on State, Third, Piasa Streets and Broadway. Other track work consists of putting in new ties, lining and resurfacing. The work is estimated at $150,000.

**Asheville (N. C.) Power & Light Company** has been given the sum of $10,000 by J. T. Harney to help defray improvement expenses. It was with the hope that the West Asheville car line could be extended to Harney Heights in order to give service to the people of that section that the offer was made. The Harney brothers have sold large tracts of land in this vicinity recently.

**Southern Public Utilities Company, Charlotte, N. C.,** has completed its reconstruction and paving on Liberty Street, Winston-Salem. An additional switch was put in on this street. The car on the Liberty Street in new track construction and paving represents an investment of approximately $40,000.

**International Railway, Buffalo, N. Y.,** will be asked by the State to give up its franchise of the old Niagara Falls interurban line unless it agrees to pay its share of the paving between the tracks. Through cars between Buffalo and Niagara Falls are now routed over the high-speed line. Only local cars use the old river road line.

**Shawnee-Tecumseh Traction Company, Shawnee, Okla.,** has begun an extensive program of reconstructing bridges and improving its lines. A new steel girder bridge will replace the wooden structure across the North Canadian River. The company also intends to purchase new equipment for both the rolling stock and track department in order to increase its service.

**Northern Cambria Street Railway, Patton, Pa.,** has agreed, it is reported, to do about five miles of construction work on the route between Carrolltown and Spanglen. The trolley route has been holding up construction on the highway, but at a recent conference the State Highway Commissioner was informed that the company would make all necessary route changes.

**Reading Transit & Light Company, Reading, Pa.,** has completed an extension whereby through express service from any point on the Reading division to the Norristown division and all parts of Philadelphia is possible. This new piece of trackage in Boyertown, Pa., was approved by the Public Service Commission. Heretofore the Reading and Norristown divisions have been separated by the Colebrookdale branch of the Philadelphia & Reading Railway.

## Power Houses, Shops and Buildings

**Charlottesville & Albemarle Railway, Charlottesville, Va.,** expects to purchase one 3,000-kw. horizontal steam turbine and two boilers.

**London & Port Stanley Railway, London, Ont.,** has completed an $8,000 terminal improvement plan. At the town station in Port Stanley improvements will be effected by putting in a concrete foundation and remodeling the interior.

**Indiana Service Corporation, Fort Wayne, Ind.,** will spend about $125,000 in power improvements. Very soon the ground will be broken for a new power distributing plant on Webster Street. The improvement will enable the company to secure a central distributing point for power generated at the power house on Spy Run Avenue It is estimated that the cost of the new building alone will exceed $25,000, while the equipment will cost $100,000 or more. Other changes are contemplated, among them being the erection of a large carhouse and car shops on the property along Spy Run Avenue to the north and west of the present power plant.

## Recent Incorporations

**Portland-Linnton (Ore.) Railway,** has been incorporated with a capital stock of $40,000. The incorporators are J. B. Schaefer, Louis Osberg and S. F. Parr.

**Savannah Railway & Power Company, Savannah, Ga.,** has been incorporated with a capital stock of $4,800,000. This is the successor company to the Savannah Electric Company.

**Duncan, Ardmore & Lawton Interurban Company** has filed its charter with the Secretary of State at Oklahoma City. The company is capitalized at $10,000. The incorporators are J. W. Marshall, A. Harris and F. T. Harris. Headquarters of the company will be at Duncan, Okla. It is proposed to promote and build an interurban line from Duncan to Ardmore and Lawton.

## Trade Notes

**American Steel & Wire Company** announces the appointment of H. S. Durant as sales agent and M. W. Floto as assistant sales agent at its Detroit office, to succeed M. Whaling and T. J. Usher, Jr., resigned.

**Delta-Star Electric Company,** Chicago, has opended a direct district office at 294 Washington Street, Boston, Mass. This office is in charge of Messrs. Anderson & Van Rosen, who have for several years been connected with the Delta-Star Engineering Department at Chicago.

**The Automatic Reclosing Circuit Breaker Company, Columbus, Ohio,** announces that it has engaged the services of Ralph R. Rugheimer, who will be responsible for its activities in the coal fields of eastern Kentucky, Virginia and southeastern Ohio. Mr. Rugheimer has a thorough knowledge of the company's apparatus and has had considerable experience in its installation and operation.

**Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.,** it is reported, is the company which the government of Chile, South America, has decided upon to go ahead with the electrification of the state railway which runs from Valparaiso to Santiago, with a branch cutting up to Los Andes in the Andes Mountains and thence across to Buenos Aires. The Westinghouse company, however, as yet has made no statement in the matter.

**The Malcolmson Briquet Engineering Company and the St. Louis Briquette Machine Company** have consolidated under the corporate name of the Malcolmson Engineering & Machine Corporation. The company will continue to act as engineers and contractors for the building of complete plants for fuel briquetting, and for drying crushing and screening of coal. It will also maintain an engineering department devoted to the generation and use of steam, special furnace design and other heat problems. In addition it will manufacture "Rutledge," "Komarek" and improved roll-type briquetting presses, fluxers and other special machinery and machine parts, direct and indirect heat dryers and vibrating screens. The officers of the new company are: C. T. Malcolmson, president; G. Komarek, vice-president; C. E. House secretary, and W. J. Monahan, treasurer. The offices of the company are located in the Old Colony Building, Chicago; 818 Security Building, St. Louis, and 39 Cortlandt Street, New York City.

**John C. Robinson,** after thirty years' continuous service in Boston as manager of New England sales for William Wharton Jr., & Company has terminated that connection. He will devote himself to his interests in the firm of Harrington, Robinson & Company of that city, an organization well known in the iron and steel trade. Starting at the time he did, Mr. Robinson has seen and participated in the many changes in street railway and steam railroad transportation methods. His pleasing personality coupled with his thorough knowledge of the track business, has made him a host of friends in both fields, as well as in the Wharton Company. The office of the Taylor-Wharton Iron & Steel Company, and William Wharton Jr. & Company in the future will be located at Room 235, Boston Safe Deposit Building, 201 Devonshire Street, Boston, in charge of Walter H. Allen.

**A. J. Manson,** of the New York district office of the Westinghouse Electric and Manufacturing Company has been appointed manager of the railway division for this district.

## New Advertising Literature

**Inspection and Energy Meters.** — The Economy Electric Devices Company, Chicago, has issued a two-page folder giving particulars of results secured with Economy meters on the cars of the Eastern Massachusetts Street Railway. Besides the advantages from the standpoint of indicating the proper car inspection interval, the meters showed energy savings as high as ½ kw.-hr. per car-mile. The company has now contracted for inspection dials on meters of 700 active cars which include 251 new safety cars.

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*When "the sum of the forces delivered to the brake-beams of the left-hand truck is equal to* 10,308 + 10,308 *lb.; that is,* 20,616 *lb., the sum of the forces delivered to the brake-beams of the right-hand truck is also known to be* 20,616 *lb."*

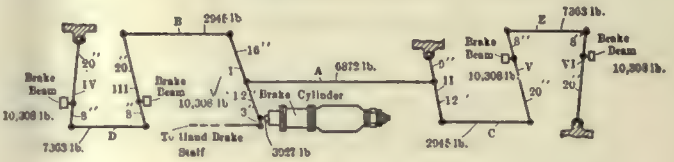

Fig.10

And so on continued Mr. H. M. P. Murphy in another of his excellent brake-rigging articles, this being from the April 16 "Determination of Forces on Eccentric Levers and Bell Cranks."

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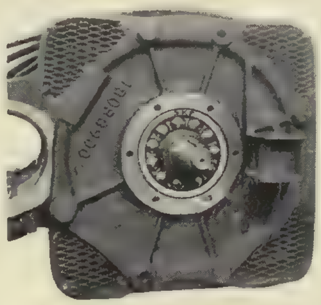

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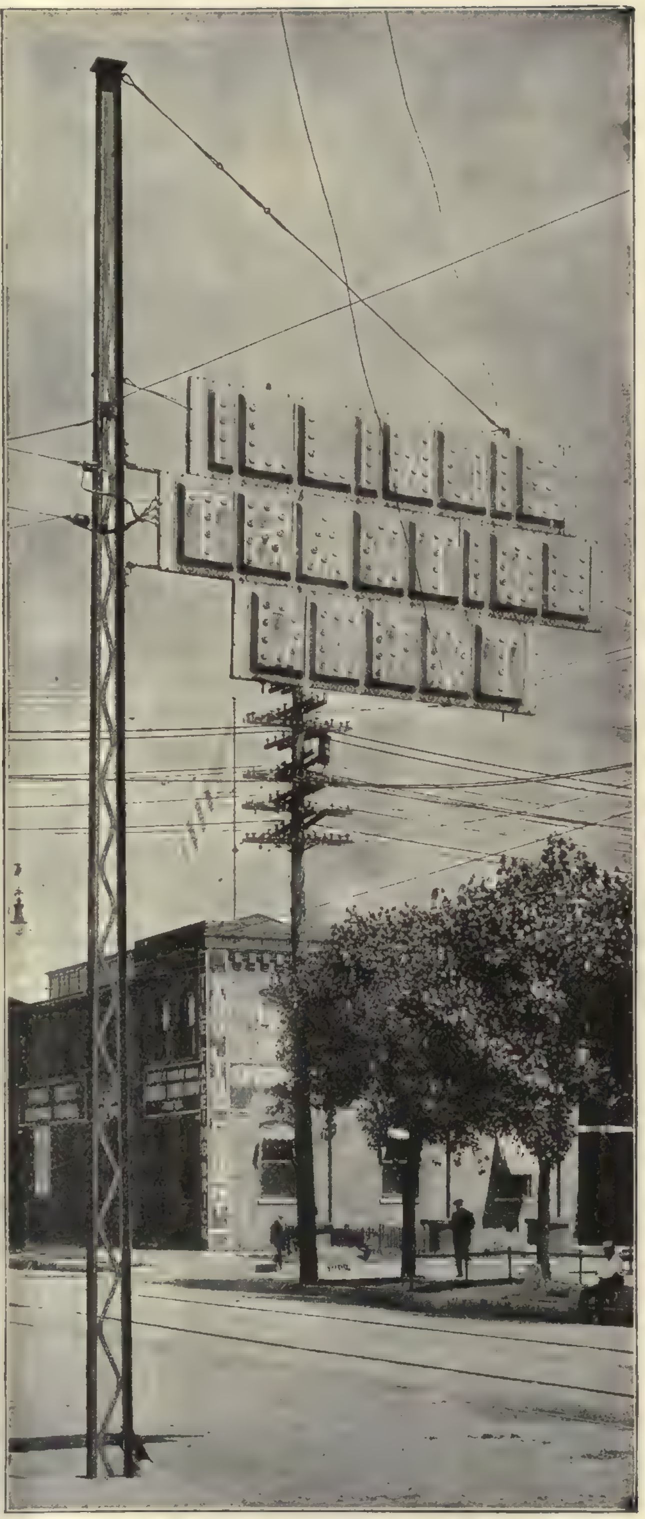

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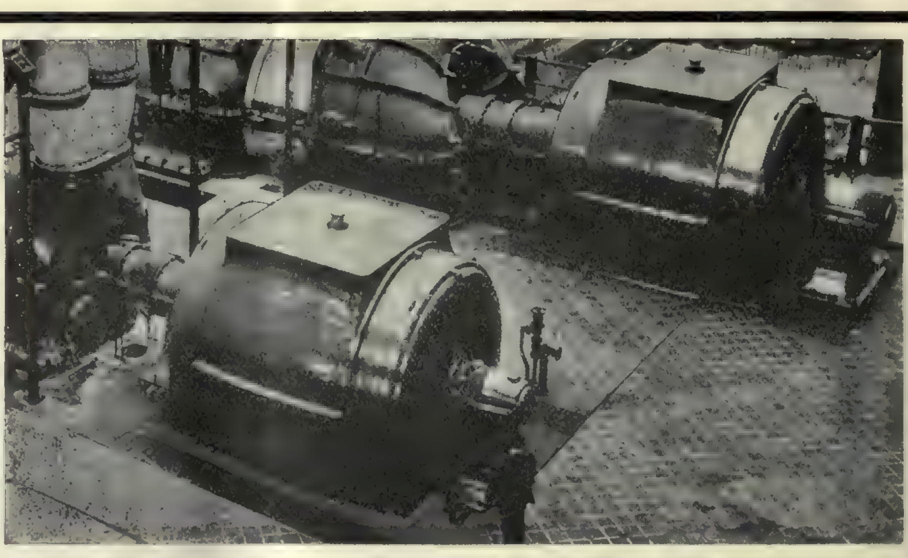

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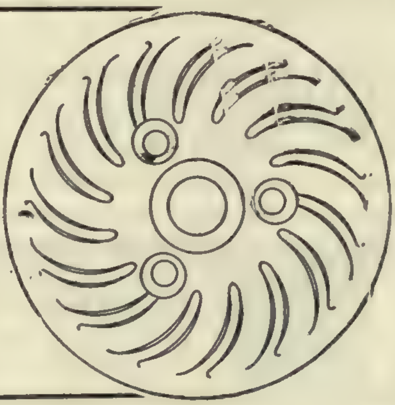

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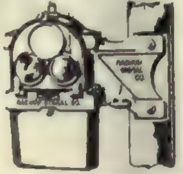

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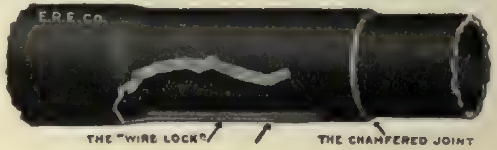

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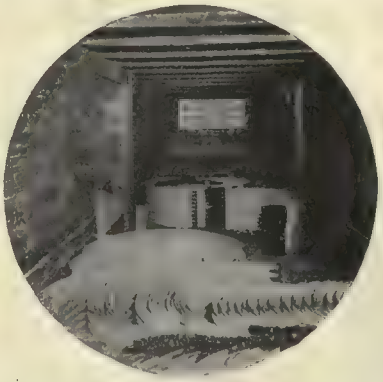

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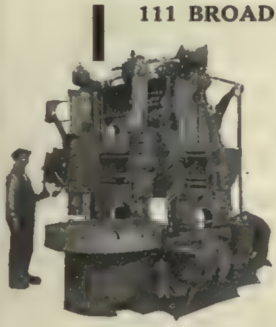

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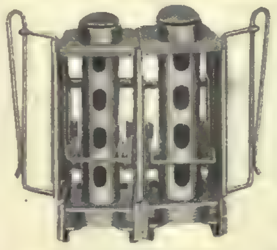

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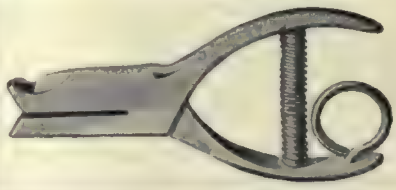

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MASTER mechanic, thoroughly experienced and efficient on maintenance and operation of city and interurban cars, shops and barns, seeks opportunity to change. PW-928, Elec. Ry. Journal, Old Colony Bldg., Chicago.

POSITION wanted in any one or a combination of the following allied power or railway activities: Purchasing agent, electrical superintendent, superintendent of construction, superintendent of distribution and operation, superintendent of rolling stock, superintendent of equipment, district superintendent. Technical graduate, eleven years' experience. Now enjoy excellent relations on engineering staff of large railway equipment manufacturer. Personal reasons fro leaving. Available upon customary notice. PW-924, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

POSITION wanted in any one or a combination of the following allied power or railway activities: Purchasing agent, electrical superintendent, superintendent of construction, superintendent of distribution and operation, superintendent of rolling stock, superintendent of equipment, district superintendent. Technical graduate, eleven years' experience. Now enjoy excellent relations on engineering staff of large railway equipment manufacturer. Personal reasons for leaving. Available upon customary notice. PW-924, Elec. Ry. Journal, Real Estate Trust Bldg., Phila., Pa.

SUPERINTENDENT of transportation with a proven record of 17 years with large city and interurban properties, desires a change. Very successful in dealing with public and labor and knows how to get results from employes. High grade references as to character and ability. Would prefer a good size city property. Relations with present employers pleasant and satisfactory. Personal reasons for desiring change. Address with details. PW-336, Elec. Ry. Journal, Old Colony Bldg., Chicago.

SUPERINTENDENT of substation desires a change; nearly 12 years' experience on large city interurban properties with a proven record; would consider maintenance only. PW-932, Elec. Ry. Journal, Old Colony Bldg., Chicago.

WANTED—A position in street railway, electric, gas or service at cost railway accounting; fifteen years' experience; can furnish the best of references. PW-334, Elec. Ry. Journal, Leader-News Bldg., Cleveland, O.

### BOOKS & PERIODICALS

**Magazines Wanted**

Back numbers of Electric Railway Journal wanted from 1910 to date. The H. W. Wilson Co., 964 University Ave., New York, N. Y.

MECH. 57

SEAT 57 S.C.

SEAT 327 S.B.

# NEW CAR SEATS

**with HEYWOOD-WAKEFIELD guarantee**

## 20% off Manufacturer's Price

| Sale Price | Mfr's Price | |
|---|---|---|
| $10.80 | $13.50 | Mechanism only. |
| $25.60 | $32.00 | Mechanism with Rattan Seat and Back |
| $20.00 | $25.00 | Mechanism with Slat Seat and Back. |

**Length overall 31¼ in.—29 in. cushion.**
**Back Offset—Aisle 2¼ in.—Wall 1¼ in.**

***Available for SAFETY or other type cars***

**These seats are NEW and in original package at factory. Prices quoted F.O.B. Wakefield, Mass., and carry MANUFACTURER'S GUARANTEE**

***Reclamation Department***

**EASTERN MASSACHUSETTS STREET RAILWAY CO.**
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**22 Dayton Fare Recorders**

200 to 250 Peter Smith No. 2-C Special hot water **Car Heaters** with cast iron expansion tanks.

**THE TRANSIT SUPPLY CO.**
Snelling and University Ave.
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## 2—1000-Kw. Westinghouse Synchronous Motor Generator Sets

Motor end—1400 kva, 2300/4000 volts, 80% P.F., 3 phase, 60 cycle, with direct connected exciter.

Generator end—1000 kw. interpole design, 600 volt, 1666 amp., speed 514 r.p.m.

***Outfits were built to operate continuously under 35 degree rise in temperature. Send for further details and prices.***

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Trucks and Motors

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**Contractors' Hoisting Engine**

Double Drum, two cylinders 5¼ in. x 7 in. Fine running order. Price $600.

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AS-333, Electrical Railway Journal
10th Ave. at 36th St., New York City

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1015 Outlook Bldg.

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***"SEARCHLIGHT"*** is the ***"OPPORTUNITY"***

advertising of this industry.

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# WHAT AND WHERE TO BUY

**Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue**

**Advertising, Street Car**
Collier, Inc., Barron G.

**Air Purifiers**
Horne Mfg. Co.

**Anchors, Guy**
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Automobiles and Buses**
Brill Co., The J. G.

**Axles**
Bemis Car Truck Co.
St. Louis Car Co.

**Axles, Car Wheel**
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Works Co.
Westinghouse Elec. & Mfg. Co.

**Axle Straighteners**
Columbia M. W. & M. I. Co.

**Babbitt Metal**
More-Jones Brass & Metal Co.

**Babbitting Devices**
Columbia M. W. & M. I. Co.

**Badges and Buttons**
Electric Service Supplies Co.
International Register Co.. The

**Batteries, Storage**
Electric Storage Battery Co.

**Bearings and Bearing Metals**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & Mfg. Co.

**Bearings, Center and Roller Side**
Stucki Co., A.

**Bearings, Oilless, Graphite, Bronze and Wood**
Bound Brook Oil-less Bearing Co.

**Bells and Gongs**
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

**Benders, Rail**
Niles-Bement-Pond Co.
Railway Track-work Co.

**Bending Apparatus**
Railway Track-work Co.

**Boilers**
Babcock & Wilcox Co.

**Boiler Tubes**
National Tube Co.

**Bond Testers**
American Steel & Wire Co.

**Bonding Apparatus**
American Steel & Wire Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

**Bonds, Rail**
American Steel & Wire Co.
Copper Clad Steel Co.
Electric Ry. Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse Elec. & Mfg. Co.

**Boring Tools, Car Wheel**
Niles-Bement-Pond Co.

**Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)**
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

**Brake Adjusters**
Hamilton & Hansell, Inc.
National Ry. Appliance Co.
Westinghouse Traction Brake Co.

**Brake Shoes**
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Brakes, Brake Systems and Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Horne Mfg. Co.
Johns-Manville, Inc.
National Brake Co.
St. Louis Car Co.
Westinghouse Traction Brake Co.

**Brooms, Track, Steel or Rattan**
American Rattan & Reed Mfg. Co.

**Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Morganite Brush Co., Inc.
United States Graphite Co.
Westinghouse Elec. & Mfg. Co.

**Brush Holders**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.

**Bus Bars**
American Copper Prod. Corp.

**Buses, Motor**
Trackless Transportation Co.

**Bushings, Case Hardened and Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.

**Bushings, Graphite and Wooden**
Bound Brook Oil-less Bearing Co.

**Cables (See Wires and Cables)**

**Cambric Tapes, Yellow and Black, Varnished**
Irvington Varnish & Insulator Co.

**Cambric, Yellow and Black, Varnished**
Irvington Varnish & Insulator Co.

**Carbon Brushes (See Brushes, Carbon)**

**Car Panel Safety Switches**
Westinghouse Elec. & Mfg. Co.

**Cars, Dump**
Differential Car Co.

**Cars, Passenger, Freight, Express, etc.**
American Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

**Cars, Second Hand**
Electric Equipment Co.

**Cars, Self-Propelled**
General Electric Co.

**Castings, Brass, Composition or Copper**
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

**Castings, Gray Iron and Steel**
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
St. Louis Car Co.

**Castings, Malleable and Brass**
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

**Catchers and Retrievers, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

**Circuit Breakers**
Automatic Reclosing Circuit Breaker Co.
Condit Electrical Mfg. Co.
Cutter Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Clamps and Connectors for Wires and Cables**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Cleaners and Scrapers—Track (See also Snow-Plows, Sweepers and Brooms)**
Brill Co., The J. G.
Ohio Brass Co.

**Clusters and Sockets**
General Electric Co.

**Coal and Ash Handling (See Conveying and Hoisting Machinery)**

**Coil Banding and Winding Machines**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Coils, Armature and Field**
Cleveland Armature Works
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coils, Choke and Kicking**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Coin-Counting Machines**
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

**Commutator Slotters**
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Commutator Truing Devices**
General Electric Co.

**Commutators or Parts**
Cameron Electrical Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Traction Brake Co.

**Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Schutte & Koerting Co.
Westinghouse Elec. & Mfg. Co.

**Condensor Papers**
Irvington Varnish & Insulator Co.

**Connectors, Solderless**
Frankel Connector Co.
Westinghouse Elec. & Mfg. Co.

**Controllers or Parts**
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Controller Regulators**
Electric Service Supplies Co.

**Controlling Systems**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.
Allison & Co., J. E.

**Conveying and Hoisting Machinery**
Columbia M. W. & M. I. Co.

**Copper Wire**
Anaconda Copper Mining Co.
Copper Clad Steel Co.

**Cord, Bell, Trolley, Register, etc.**
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

**Cord Connectors and Couplers**
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

**Couplers, Car**
Amer. Steel Foundries
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Traction Brake Co.

**Cranes**
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

**Cross Arms (See Brackets)**

**Crossing Foundations**
International Steel Tie Co.

**Crossing Signals (See Signals, Crossing)**

**Crossings, Frog and Switch**
Wharton, Jr., & Co., Wm.

**Crossings, Track (See Track, Special Work)**

**Crushers, Rock**
Allis-Chalmers Mfg. Co.

**Culverts**
Canton Culvert & Silo Co.

**Curtains and Curtain Fixtures**
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

**Cutouts**
Chicago Fuse Mfg. Co.
Johns-Manville, Inc.

**Dealers' Machinery**
Archer & Baldwin
Electric Equipment Co.

**Derailing Devices (See also Track Work)**
Wharton Jr., & Co., Wm.

**Destination Signs**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

**Detective Service**
Wish Service, P. Edward

**Dogs, Lathe**
Williams & Co., J. H.

**Door Operating Devices**
Consolidated Car Heating Co.
National Pneumatic Co., Inc.

**Doors and Door Fixtures**
Brill Co., The J. G.
General Electric Co.

**Doors, Folding Vestibule**
National Pneumatic Co., Inc.

**Draft Rigging (See Couplers)**

**Drills, Track**
American Steel & Wire Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

**Dryers, Sand**
Electric Service Supplies Co.

**Electrically Operated Switches (Air or Oil)**
Condit Electrical Mfg. Co.

**Electrical Wires and Cables**
American Electrical Works
American Steel & Wire Co.
Roebling's Sons Co., J. A.

**Engineers, Consulting, Contracting and Operating**
Allison & Co., J. E.
Archbold-Brady Co.
Arnold Co., The
Beeler, John
Byllesby & Co., H. M.
Clark & Co., Mgr., Corp., E. W.
Day & Zimmermann
Feustel, Robert M.
Ford, Bacon & Davis
Gould, L. E.
Hemphill & Wells
Holst, Englehardt W.
Jackson, Walter
Kelley, Cooke & Co.
Parsons, Klapp, Brinkerhoff & Douglas
Richey, Albert S.
Sanderson & Porter
Sangster & Matthews
Smith & Co., C. E.
Stone & Webster
White Engineering Corp., The J. G.

**Engines, Gas, Oil or Steam**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Fare Boxes**
Cleveland Fare Box Co.
Economy Electric Devices Co.
Johnson Fare Box Co.
National Railway Appliance Co.

**Feed Water Heating**
Schutte & Koerting Co.

**Fences, Woven Wire and Fence Posts**
American Steel & Wire Co.

**Fenders and Wheel Guards**
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.

**Fibre and Fibre Tubing**
Continental Fibre Co.
Johns Manville, Inc.
Westinghouse Elec. & Mfg. Co.

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Diamond "S" Steel Back is the Best Type

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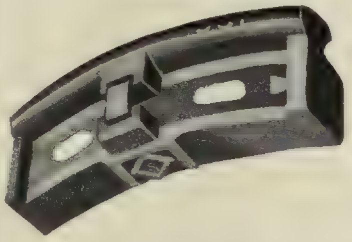
**SAFETY CAR**



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*Ratha Saptami*

During one of the festivals which punctuate the solar year in India, the Ratha Saptami, or Seventh Day, is devoted to worship of the Sun. This because, according to a certain theory of creation, the Sun mounted his chariot on the Seventh day.

In divers parts of these United States the Seventh Day is far from being the restful day of devotion it ought to be —particularly where motor brushes sputter along at least six days a week, trying to work under conditions they were never built to meet.

No use cussing for a Son-of-a-Seacook the man who sells misfit brushes. The fault is in the buying. Buy brushes by Character instead of by Catalogue. Let competent experts prescribe brushes that fit operating conditions—a la Morganite! That's the secret of satisfactory brush performance.

Let your only Sunday troubles be the Blue Laws.

**They're enough!**

**Morganite Brush Co., Inc.**

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Electric Power Equipment Corp., 13th and Wood Sts., Philadelphia.
Electrical Engineering & Mfg. Co., 909 Penn Ave., Pittsburgh.
B. W. Lillie Corporation, 176 Federal St., Boston, Mass.
W. B. Hendey Co., Hoge Bldg., Seattle.

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Herzog Electric & Engineering Co., 150 Steuart St., San Francisco.
Charles Farnham, I. W. Hellman Bldg., Los Angeles.
Railway & Power Engineering Corporation, Ltd., 131 Eastern Ave., Toronto, Ontario, Canada.

## WHAT AND WHERE TO BUY

**Field Coils (See Coils)**

**Filters, Water**
Scaife & Sons Co., Wm. B.

**Fire Extinguishers**
Johns-Manville, Inc.

**Floodlights**
Electric Service Supplies Co.

**Flooring Composition**
American Mason Safety Tread Co.
Johns-Manville, Inc.

**Floor Plates**
American Abrasive Metals Co.

**Forgings**
Columbia M. W. & M. I. Co.
Standard Steel Works Co.
Williams & Co., J. H.

**Frogs, Track (See Track Work)**

**Funnel Castings**
Wharton, Jr., & Co., Wm.

**Fuses and Fuse Boxes**
Columbia M. W. & M. I. Co.
General Electric Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. H.

**Fuses, Refillable**
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
General Electric Co.

**Gages, Oil and Water**
Ohio Brass Co.

**Gaskets**
Johns-Manville, Inc.
Power Specialty Co.
Westinghouse Traction Brake Co.

**Gas-Electric Cars**
General Electric Co.

**Gas Producers**
Westinghouse Elec. & Mfg. Co.

**Gates, Car**
Brill Co., The J. G.

**Gear Blanks**
Standard Steel Works Co.

**Gear Cases**
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

**Gears and Pinions**
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

**Generating Sets, Gas-Electric**
General Electric Co.

**Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Gongs (See Bells and Gongs)**

**Graphite**
Morganite Brush Co., Inc.

**Grates, Chain**
Green Eng. Co.

**Greases (See Lubricants)**

**Grinders and Grinding Supplies**
Metal & Thermit Corp.
Railway Track-work Co.

**Grinding Blocks and Wheels**
Railway Track-work Co.

**Guards, Trolley**
Electric Service Supplies Co.
Ohio Brass Co.

**Hacksaws**
Gladium Co., Inc.

**Harps, Trolley**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

**Headlights**
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

**Headlining**
Haskelite Mfg. Co.

**Heaters, Car (Electric)**
Consolidated Car Heating Co.
Economy Electric Devices Co.
Gold Car Heating & Lighting Co.
National Ry. Appliance Co.
Smith Heater Co., Peter

**Heaters, Car, Hot Air and Water**
Cooper Heater Co.
Smith Heater Co., Peter

**Heaters, Car (Stove)**
Electric Service Supplies Co.
Smith Heater Co., Peter

**Hoists and Lifts**
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.

**Hose, Bridges**
Ohio Brass Co.

**Hydraulic Machinery**
Allis-Cha'mers Mfg. Co.
Niles-Bement-Pond Co.

**Injectors**
Schutte & Koerting Co.

**Inspection**
Electrical Testing Lab's

**Instruments, Measuring, Testing and Recording**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Insulating Cloth, Paper and Tape**
General Electric Co.
Irvington Varnish & Insulator Co.
Johns-Manville, Inc.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

**Insulating, Silk**
Irvington Varnish & Insulator Co.

**Insulation (See also Paints)**
Anderson Mfg. Co., A. & J. M.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Irvington Varnish & Insulator Co.
Johns-Manville, Inc.
Westinghouse Elec. & Mfg. Co.

**Insulation Slot**
Irvington Varnish & Insulator Co.

**Insulators (See also Line Material)**
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Insulator Pins**
Electric Service Supplies Co.
Hubbard & Co.

**Jacks (See also Cranes, Hoists and Lifts)**
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.

**Joints, Rail**
Rail Joints Co.
Zelnicker Supply Company, Inc., Walter A.

**Journal Boxes**
Bemis Car Truck Co.
Brill Co., The J. G.

**Junction Boxes**
Standard Underground Cable Co.

**Lamp Guards and Fixtures**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Arc and Incandescent (See also Headlights)**
Anderson Mfg. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lamps, Signal and Marker**
Nichols-Lintern Co.
Ohio Brass Co.

**Lanterns, Classification**
Nichols-Lintern Co.

**Lathe Attachments**
Williams & Co., J. H.

**Lathes, Car Wheel**
Niles-Bement-Pond Co.

**Lightning Protection**
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Line Material (See also Brackets, Insulators, Wires, etc.)**
Anderson Mfg. Co., A. & J. M.
Archbold-Brady Co.
Columbia M. W. & M. I. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Hubbard & Co.
Johns-Manville, Inc.
More-Jones Brass & Metal Co
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

**Locking Spring Boxes**
Wharton, Jr., & Co., Wm.

**Locomotives, Electric**
General Electric Co.
Westinghouse Elec. & Mfg. Co.

**Lubricating Engineers**
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

**Lubricants, Oil and Grease**
Galena-Signal Oil Co.
Texas Co.
Universal Lubricating Co.

**Machine Tools**
Columbia M. W. & M. I. Co.
Niles-Bement-Pond Co.

**Machine Work**
Columbia M. W. & M. I. Co.

**Magnet Wire**
Belden Mfg. Co.

**Manganese Steel Castings**
Wharton, Jr. & Co., Wm.

**Manganese Steel Special Track Work**
Wharton, Jr., & Co., Wm.

**Meters (See Instruments)**
Electric Service Suplies Co.

**Molded Insulations and Parts**
Belden Mfg. Co.

**Money Changers**
Galef, J. L.

**Motor Buses**
Trackless Transportation Co.

**Motormen's Seats**
Brill Co., J. G., The
Electric Service Supplies Co.
Wood Co., Chas. N.

**Motors, Electric**
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

**Motors and Generators, Sets**
General Electric Co.

**Nuts and Bolts**
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.

**Oil Burning Equipment**
Schutte & Koerting Co.

**Oil Circuit Breakers**
Condit Electrical Mfg. Co.

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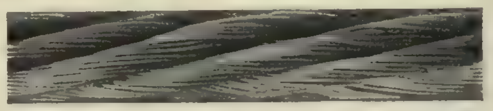

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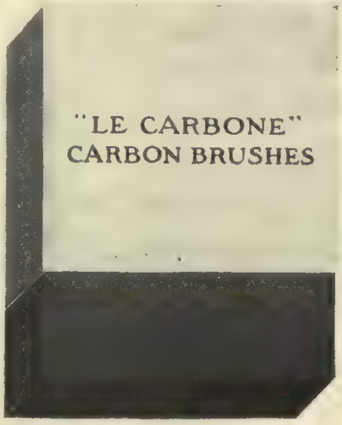

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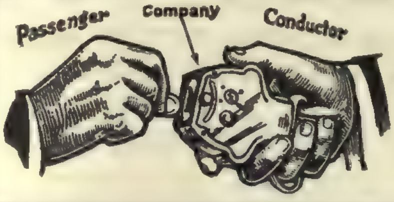

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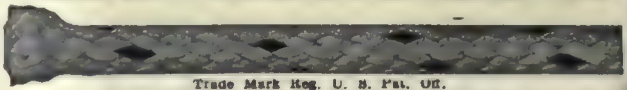

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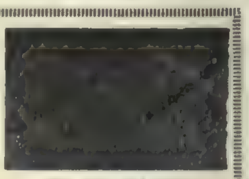

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# ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Page

Allis-Chalmers Mfg. Co. ... 27
Allison & Co., J. E. ... 17
American Abrasive Metals Co. ... 34
Amer. Brake Shoe & Fdry. Co. ... 31
American Car Co. ... 39
American Electrical Works ... 24
American Mason S. T. Co. ... 36
American Rattan & Reed Mfg. Co. ... 33
American Steel & Wire Co. ... 31
Amer. Steel Foundries ... 36
Anaconda Copper Mining Co. ... 24
Anderson Mfg. Co., A. & J. M. ... 24
Archbold-Brady Co. ... 25
Archer & Baldwin, Inc. ... 29
Arnold Co., The ... 16
Automatic Reclosing Circuit Breaker Co. ... 27

B

Babcock & Wilcox Co. ... 26
Barbour-Stockwell Co. ... 26
Bates Expanded Steel Truss Co. 21
Beeler, John A. ... 16
Belden Mfg. Co. ... 33
Bemis Car Truck Co. ... 18
Bennett-Field Cross Tie Co. ... 24
Bonney-Vehslage Tool Co. ... 28
Bound Brook Oil-less Bearing Co. 33
Bridgeport Brass Co. ... 6
Brill Co., The J. G. ... 39
Buckeye Jack Mfg. Co. ... 27
Byllesby Eng. & Mfg. Corp. ... 16

C

Cambria Steel Co. ... 25
Cameron Electrical Mfg. Co. ... 27
Canton Culvert & Silo Co. ... 25
Clark & Co. Mgr. Corp., E. W. ... 16
Cleveland Fare Box Co. ... 28
Collier, Inc., Barron G. .. Back Cover
Columbia M. W. & M. I. Co. ... 38
Consolidated Car Fender Co. ... 33
Consolidated Car Heating Co. ... 33
Continental Fibre Co., The ... 27
Cooper Heater Co. ... 33
Copper Clad Steel Co. ... 25

Page

Cutter Co. ... 27

D

Day & Zimmermann, Inc. ... 17
Differential Steel Car Co., The. ... 36
Duncan Lumber Co. ... 24

E

Eastern Massachusetts St. Ry. Co. ... 29
Electric Equipment Co. ... 29
Electric Ry. Improvement Co. ... 26
Electric Railway Equipment Co. 24
Electric Service Supplies Co. ... 7

F

Feustel, Robt. M. ... 16
Ford, Bacon & Davis ... 16
Ford Chain Block Co. ... 27
"For Sale" Ads ... 28, 29
Fort Pitt Spring & Mfg. Co. ... 34

G

Galena-Signal Oil Co. ... 13
General Electric Co. ... 14
Gladium Co., Inc. ... 27
Globe Ticket Co. ... 17
Gold Car Heating & Ltg. Co. ... 33
Gould, L. E. ... 16
Griffin Wheel Co. ... 23

H

Hamilton & Hansell, Inc. ... 36
Haskelite Mfg. Corp. ... 17
"Help Wanted" Ads ... 28
Hemphill & Wells ... 16
Holst, Englehardt W. ... 16
Horne Mfg. Co. ... 25
Hubbard & Co. ... 25

I

International Register Co., The. 28
International Steel Tie Co., The Front Cover

Page

Irvington Varnish & Insulator Co. ... 22

J

Jackson, Walter ... 16
Jeandron, W. J. ... 33
Johns-Manville, Inc. ... 37
Johnson Fare Box Co. ... 28

K

Kelly, Cooke & Co. ... 17
Kuhlman Car Co. ... 39

M

Metal & Thermit Corp. ... 25
Midvale Steel & Ordnance Co. ... 25
More-Jones Brass & Metal Co. ... 35
Morganite Brush Co., Inc. ... 31

N

Nachod Signal Co., Inc. ... 24
National Brake Co. ... 15
National Carbon Co., Inc. ... 17
National Pneumatic Co., Inc. ... 9
National Railway Appliance Co. 35
Nelsonville Brick Co. ... 25
Nichols-Lintern Co. ... 36
Niles-Bement-Pond Co. ... 27
Nuttall Co., R. D. ... 12

O

Ohio Brass Co. ... 5

P

Parsons, Klapp, Brinckerhoff & Douglas ... 16
Perey Mfg. Co., Inc. ... 28
Positions Wanted and Vacant ... 28
Power Specialty Co. ... 26

R

Rail Joint Co. ... 27

Page

Railway Track-work Co. ... 8
Railway Utility Co. ... 34
Ramapo Iron Works ... 25
Richey, Albert S. ... 16
Roebling's Sons Co., John A. ... 24
Rooke Automatic Register Co. ... 33

S

St. Louis Car Co. ... 22
Samson Cordage Works ... 34
Sanderson & Porter ... 16
Sangster & Matthews ... 17
Scaife & Sons Co., Wm. B. ... 26
Schutte & Koerting ... 26
Searchlight Section ... 28, 29
Silver Lake Co. ... 35
Smith & Co., C. E. ... 16
Smith Heater Co., Peter ... 33
Standard Steel Works Co. ... 20
Standard Underground Cable Co 24
Southern Cypress Mfg. Assn. ... 21
Star Brass Works ... 35
Stone & Webster ... 16
Stucki Co., A. ... 36

T

Terry Steam Turbine Co. ... 26
Texas Co. ... 19
Tool Steel Gear & Pinion Co. ... 23
Trackless Transportation Co. ... 35

U

U. S. Electric Signal Co. ... 25
Universal Lubricating Co. ... 11

W

"Want" Ads ... 28
Wason Mfg. Co. ... 39
Westinghouse Elec. & Mfg. Co. ... 2
Westinghouse Traction Brake Co. 4
Wharton, Jr., & Co., Wm. ... 25
White Engineering Corp., The J. G. ... 16
Williams & Co., J. H. ... 27
Wish Service, The P. Edw. ... 36
Wood Co., Chas. N. ... 24

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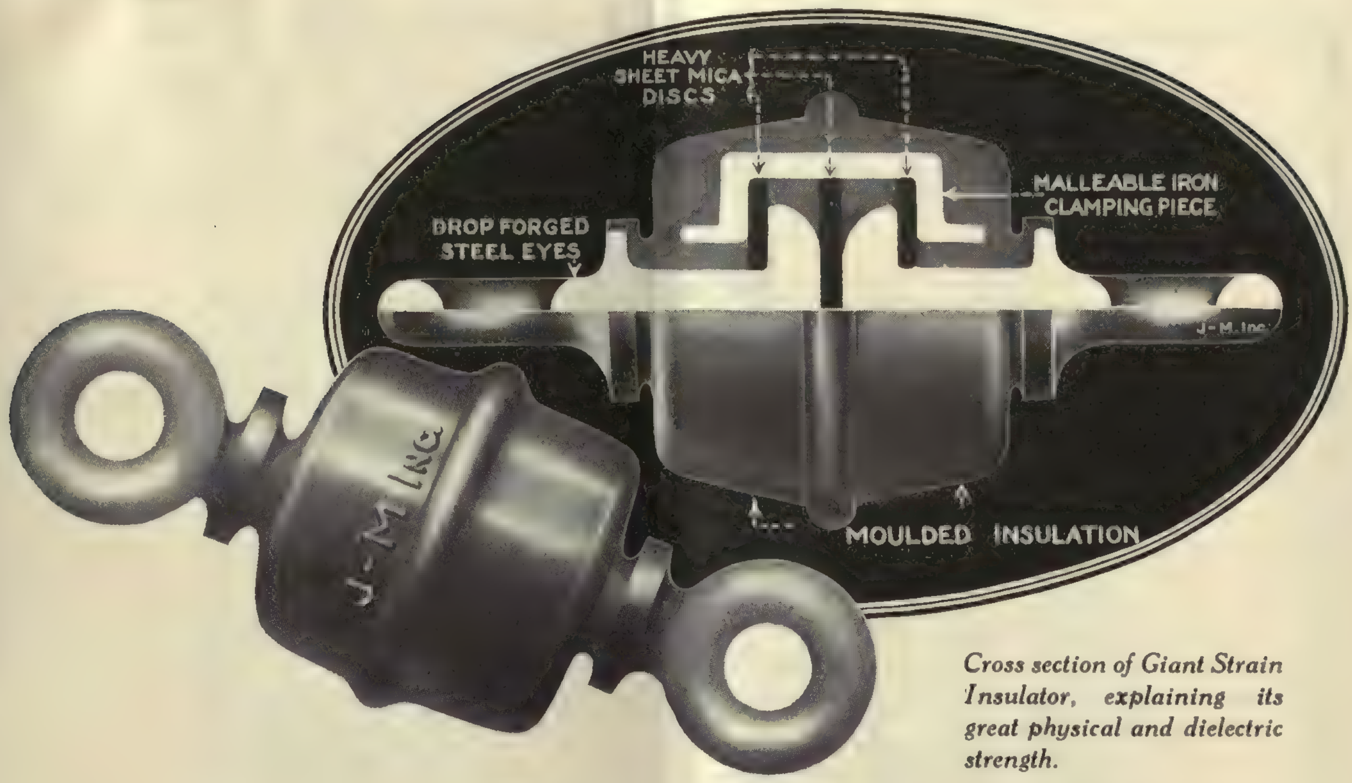

*Cross section of Giant Strain Insulator, explaining its great physical and dielectric strength.*

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# Controller Inspection and Maintenance

The best authorities suggest that controllers should be inspected after each 300-500 mile run, and should be thoroughly over-hauled every 60,000 miles. Defective and worn parts should be replaced—***not sent out to "go-a-little-longer."***

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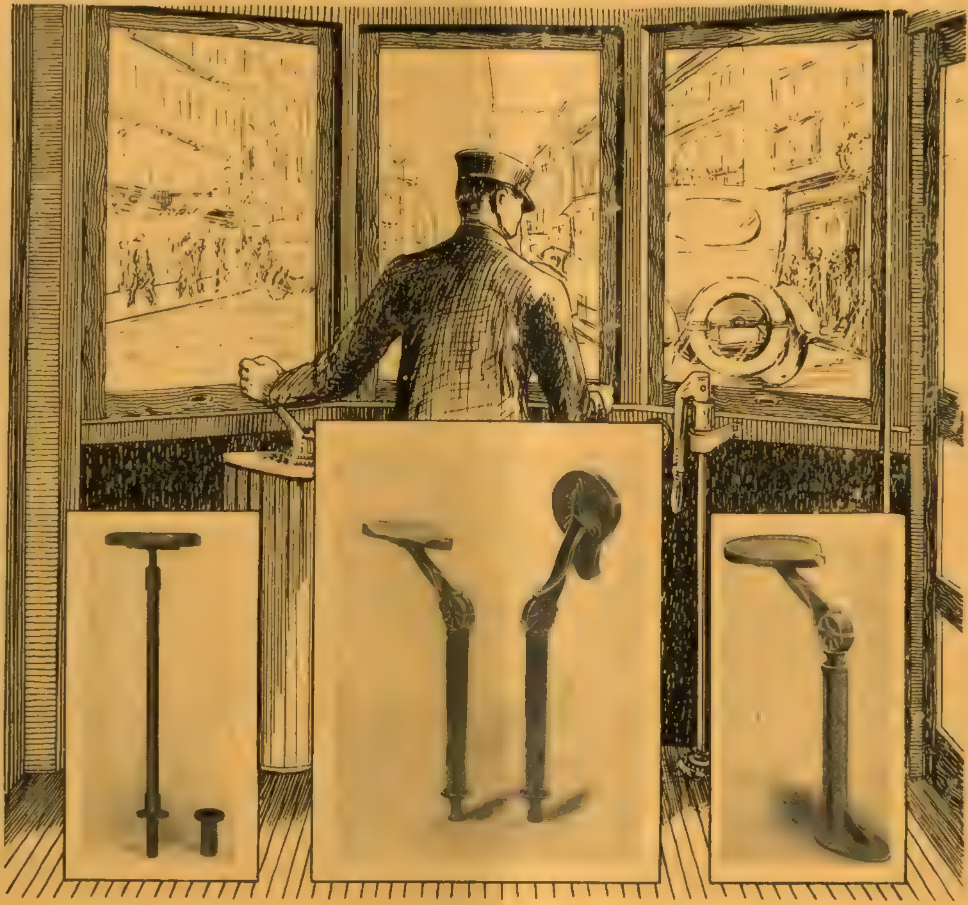
# Brill Motormen's Seats



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***Copy of Bulletin No. 248—"Brill Seats for Motormen and Conductors"—will be mailed upon request.***

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**Barron G. Collier**

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